PB-228 707

ENVIRONMENTAL PROTECTION AGENCY. A PROGRESS REPORT DECEMBER 1970-JUNE 1972

Environmental Protection Agency
Washington, D.C.

November 1972

DISTRIBUTED BY:

NTIS
National Technical Information Service
U. S. DEPARTMENT OF COMMERCE
5285 Port Royal Road, Springfield Va. 22151

PB 228 707

ENVIRONMENTAL PROTECTION AGENCY
a progress report

DECEMBER 1970 - JUNE 1972

PUBLISHED NOVEMBER 1972

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U S Department of Commerce
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To the American People:

Earth Day I, in April of 1970, signaled the awakening of an environmental conscience in this nation. Clearly we Americans had abused our natural heritage.

The air was cluttered with pollutants difficult to control and unhealthy to breathe. Our waters from the Potomac to the Snake Rivers had been severely ravaged by the works and neglect of man. We littered, abused and wasted our land with little or no thought for the shape of the future. Pesticides were poorly controlled, and we exposed our fellow citizens every year to some 900 new chemical compounds whose environmental or human impact were largely unknown.

That was eight months before the creation of the Environmental Protection Agency. After more than a year of operation, this is now history. Unfortunately, those problems and others remain and probably will for some time, but we are making progress. In the environment as elsewhere real progress comes one step at a time.

In our first year we set national ambient air quality standards that will protect the health of every American citizen.

In our first year we attempted to open up the whole process by which we determine which pesticides we can tolerate in the environment and for what purposes.

In our first year we established three National Environmental Research Centers to conduct on-going studies on the health and ecological effects of environmental contaminants as well as to pursue the search for technological controls of all forms of pollution.

In our first year we completed some major studies on the recovery of municipal waste which chart a definite course for use in solid waste management.

These efforts are not a cause for alleluias — or predictions of the millenium. Rather, they are the sound foundations upon which real

William D. Ruckleshaus

progress depends. I believe in the first year of this Agency, we have plotted a course in which demonstrable and visible improvement of our air, land and water will increasingly occur in the next few years.

On balance, a great deal of attention has been paid to this Agency and to the cause we served in this first year. Hardly a week has gone by without the emergence of new environmental issues: the Cross-Florida Barge Canal and a jet port in the Everglades; the Supersonic Transport and the Alaska Pipeline; national air quality standards and the Refuse Act Permit Program; mercury in the water and asbestos in the air; NTA and PCB's; DDT and 2,4,5–T.

In fact, the rate at which environmental impact statements arrive in our EPA offices around the country leads one to believe that everything is an environmental issue. Perhaps that is the greatest measure of our progress in the first year. The fact is sinking in among all elements of our society that, sooner or later, everything *is* an environmental issue. Dr. Barry Commoner propounds as the First Law of Ecology "Everything is Connected to Everything Else." I believe in this country we are beginning to realize the validity of that proposition, but more importantly, we are beginning to search out the connections and we are striving to understand them.

The real significance of the debate over individual environmental issues in the Agency's first year does not lie in the specifics nor in the disposition of each case. The significance lies in the debate itself. The fact that it occurred—that questions never before asked about our personal and corporate actions *were* raised is a new, and I think, permanent element in American life.

I believe it's all to the good.

William D. Ruckelshaus
Administrator

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INTRODUCTION

CREATION OF EPA

The Environmental Protection Agency's creation was recommended to President Nixon by the President's Advisory Council on Executive Organization, headed by Roy L. Ash. The Ash Council recommendations ultimately resulted in Reorganization Plan No. 3 of 1970, which President Nixon submitted to Congress on July 9, 1970. In the absence of negative Congressional action, the provisions of Reorganization Plan No. 3 took effect on December 2, 1970.

The creation of EPA brought together in one Agency a variety of research, monitoring, standard-setting and enforcement activities formerly scattered through several departments and agencies.

With its broad mandate, the Environmental Protection Agency is developing competence in areas of environmental protection which previously have not been given sufficient attention, such as the problem of noise as a degradation of the Nation's environment. Thus, for the first time, there is a governmental structure for approaching pollution control problems in terms of the total environment, perceiving it as a single, interrelated system.

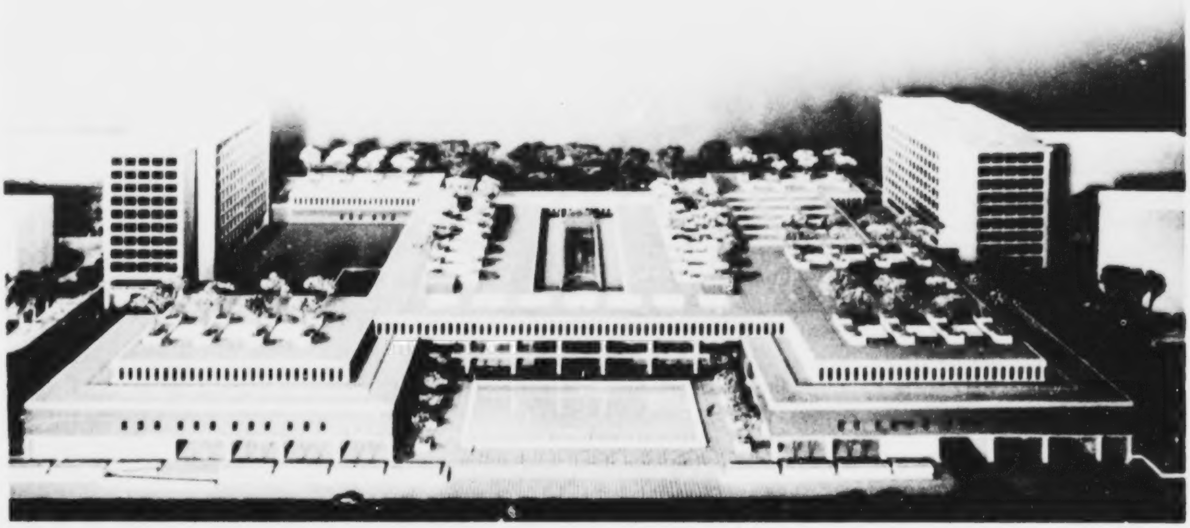
In brief, these are the principal functions that were transferred to EPA:

Federal Water Quality Administration. Charged with the control of pollutants which impair water quality, FWQA was broadly concerned with the impact of degraded water quality. It performed a wide variety of functions, including research, standard-setting and enforcement, and provided construction grants and technical assistance.

Certain pesticides research authority from the Department of the Interior. Authority for research on the effects of pesticides on fish and wildlife has been provided to EPA through transfer of the specialized research authority of the pesticides act enacted in 1958. Interior retains its responsibility to do research on all factors affecting fish [illegible] wildlife. Under this provision, only one laboratory was transferred to EPA—the Gulf Breeze Biological Laboratory of the Bureau of Commercial Fisheries. EPA works closely with the fish and wildlife laboratories remaining with the Bureau of Sport Fisheries and Wildlife.

National Air Pollution Control Administration. As the principal Federal agency concerned with air pollution, NAPCA conducted research on the effects of air pollution, operated a monitoring network, and promulgated criteria which served as the basis of setting air quality standards. Its regulatory functions were similar to those of the Federal Water Quality Administration. NAPCA was responsible for administering the Clean Air Act, which involved designating air quality regions, approving State standards, and providing financial and technical assistance to State control agencies to enable them to comply with the Act's provisions. It also set and enforced Federal automotive emission standards.

Elements of the Environmental Control Administration. ECA was the focal point within the Department of Health, Education and Welfare for evaluation and control of a broad range of environmental health problems, including water supply, solid wastes, and



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radiation. Programs in ECA involved research and development of criteria and standards, and the administration of planning and demonstration grants. From ECA, the activities of the Bureaus of Water Hygiene and Solid Waste Management and portions of the activities of the Bureau of Radiological Health were transferred to EPA. Other functions of ECA, including those related to the regulation of radiation from consumer products and occupational safety and health, remain in HEW.

Pesticides research and standard-setting programs of the Food and Drug Administration. FDA's pesticides program consisted of setting and enforcing standards which limit pesticide residues in food. EPA now has the authority to set pesticide standards and to monitor compliance with them, as well as to conduct related research. However, as an integral part of its food protection activities, FDA retains its authority to remove food with excess pesticide residues from the market.

General ecological research from the Council on Environmental Quality. The authority to perform studies and research relating to ecological systems, in addition to EPA's other specific research authorities, helps EPA measure the impact of pollutants. The Council on Environmental Quality retains its authority to conduct studies and research relating to environmental quality.

Environmental radiation standards programs. The Atomic Energy Commission was responsible for establishing environmental radiation standards and emission limits for radioactivity. Those standards have been based largely on broad guidelines recommended by the Federal Radiation Council. The Atomic Energy Commission's authority to set standards for the protection of the general environment from radioactive material was transferred to EPA. The functions of the Federal Radiation Council were also transferred. AEC retains responsibility for the implementation and enforcement of radiation standards through its licensing authority.

Pesticides registration program of the Agricultural Research Service. The Department of Agriculture was responsible for several distinct functions related to pesticides use. It conducted research on the efficacy of various pesticides, as related to other pest control methods, and on the effects of pesticides on non-target plants, livestock, and poultry. It registered pesticides, monitored their persistence and carried out an educational program on pesticide use through its extension service. It conducted pest control programs in which pesticides were utilized extensively.

By transferring the Department of Agriculture's pesticides registration and monitoring function to EPA, and merging it with the pesticides programs transferred from HEW and Interior, the new Agency was given a broad capability for control over the introduction of pesticides into the environment.

The Department of Agriculture continues to conduct research on the effectiveness of pesticides. It furnishes this information to EPA, which has the responsibility for actually licensing pesticides for use, after considering environmental and health effects.

EPA, as a new Federal force in the environment, presents substantial opportunity to accomplish positive environmental improvement. It is an independent regulatory Agency with no adjudicative powers, reporting directly to the Office of the President. No longer is the setting and enforcement of environmental quality standards in the hands of an agency which also has a promotional interest. EPA's sole charge is to see that the standards it sets and enforces, adequately protect the total environment.

Another significant aspect of EPA is that it provides a mechanism for a coordinated approach to environmental improvement. No longer will there be water pollution and solid waste disposal agencies urging solutions to waste disposal problems, which only serve to exacerbate or create serious air pollution problems. And, no longer will Federal environmental research plunge off in all directions, unrelated to any overall plan for dealing with the total environment.

EPA intends to make major decisions publicly and openly. For example, in January 1971 a Federal court ordered EPA to decide whether the pesticide DDT should be suspended and prohibited from interstate transport. The Agency took the unprecedented step of imposing a 60-day deadline on itself to make the decision and requested comments from the public as to whether DDT posed an imminent hazard, which would require suspension under the Federal Insecticide, Fungicide and Rodenticide Act. More than 500 submissions were received which were considered along with data compiled by EPA's Pesticide Office and scientific experts. EPA's final decision was that the statutory test for suspension had not been met. However, the potential harm proposed by DDT did warrant an aggressive administrative process called "cancellation" under the Act, to determine whether, on a risk-benefit basis, the registration of DDT products should be continued. EPA then issued a 23-page opinion which detailed reasons for the DDT decision, as well as related decisions on 2,4,5–T, Mirex, aldrin and dieldrin.

ENVIRONMENTAL LEGISLATION

Since EPA is a new initiative in guaranteeing environmental quality, it is worthwhile to review the efforts of the Federal Government which have culminated in the establishment of this Agency.

The evolution of Federal pollution control legislation represents the attempt by Washington to come to grips with the seriousness of pollution problems consistent with traditional concepts of Federalism. The States and Federal Governments played their respective roles and despite the Donora, Pennsylvania, air pollution disaster of 1948, in which 20 died and 6,000 were made ill, major Federal pollution programs were first initiated in water. Until 1948, the States had exclusive control over the problems of water pollution. With the passage of the Federal Water Pollution Control Act of 1948, the Federal Government began to move in.

In 1956, the Water Pollution Control Act was amended, and these changes set up the basic structure of Federal water pollution enforcement procedures for the next 14 years. The 1956 amendment provided for an enforcement conference to be called by the Federal Government and to include all interested parties, especially the States. In six months, if no action was taken to abate the problem under study, a hearing could be held. The hearing was to be followed by another six-month waiting period, after which the case could be taken to court. This procedure required an accusation that a State had failed to act, before the Federal Government could go to court. Until the creation of EPA, only one case had appeared in court.

The Water Quality Act of 1965 made far-reaching changes in the Federal role. It provided for the setting, by the States, of water quality standards, subject to the approval of the Secretary of HEW (now EPA). It also provided for the creation of a Federal Water Pollution Control Administration, which would assume administrative control for these programs from the Public Health Service.

Again in 1966, with the signing of the Clean Water Restoration Act, Federal involvement increased. This Act provided for another increase in Federal construction grants.

The Water Quality Improvement Act of 1970 changed the name of the Federal authority designed to deal with water pollution to the Federal Water Quality Administration. This new Act contained tighter regulations related to oil and vessel pollution, Alaskan village demonstrations, a program to solve the acid mine drainage problems and several other functions.

In the area of air pollution, the legislative program is essentially the same with a later timetable. Despite the Donora disaster of 1948, and the emergence of the smog problem in Los Angeles in the early 1950's, Federal air pollution legislation was not enacted until 1955.

Finally in 1963, following the London "Killer Smog" of 1962, in which 700 died, Congress passed the Clean Air Act. Essentially, its enforcement procedures were the same as those developed for water pollution: a conference, hearings and court action if no abatement. This Act also provided funds for further research into the problems of air pollution and its control and provided grants for the development of State and local air pollution control agencies.

In 1965, with the passage of the Motor Vehicle Air Pollution Control Act, the Federal Government recognized the need to control pollution caused by automobiles. It initiated the procedures which resulted in the first vehicular controls in 1968.

The major thrust of Federal concern for air pollution came with the passage of the Clean Air Act of 1967 which allows for the designation of air quality control regions, either within a State or interstate. After such designation, the Secretary of HEW (now EPA) set air quality criteria for specified air pollutants. The State, or States, set air quality standards, subject to the Secretary's approval, and then provide an implementation plan, also subject to approval.

The Clean Air Amendments of 1970 now allow EPA to set air quality standards nationwide, not just within regions. The Act further provides stricter regulations on auto exhaust emissions, and stronger enforcement procedures which permit EPA, as the successor to HEW, to move with more flexibility and authority.

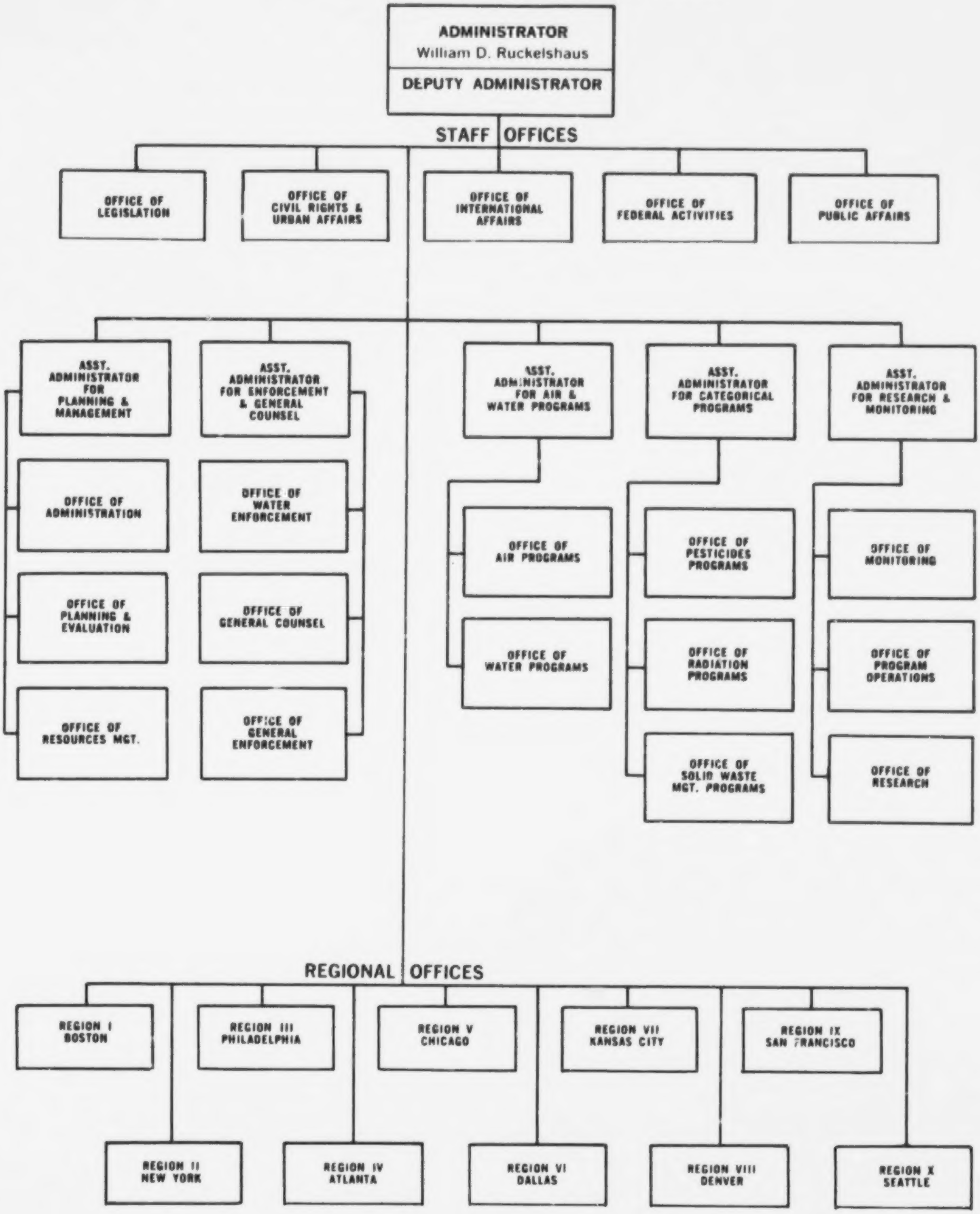
The Resources Recovery Act of 1970 added new facets to the earlier Solid Waste Disposal Act of 1965, including not only solid waste "disposal" but also solid waste "recovery" and "recycling." This addition stipulates that special studies and demonstration projects be undertaken to determine means of recovering materials and energy from solid wastes. The Act also provides for grants to promote area-wide solid waste planning by cities and States, including methods for collecting, separating and disposing of trash; to train personnel of all kinds; and to build new, state-of-the-art, solid waste facilities for recycling or recovering energy or material resources.

To meet the expanding need for electricity, the utilities have been turning principally to nuclear power stations. EPA does not have licensing power over the nuclear power industry. That authority belongs to the Atomic Energy Commission, primarily through its power to issue construction and operating permits for reactors. But EPA can influence the safe siting and operation of these reactors with authorities transferred in the President's Reorganization Plan No. 3 of 1970. These authorities are the establishment of radiation standards to insure that no significant harmful effects will occur in the population, the approval of thermal effects standards set by the States, and the reviewing of environmental impact statements for nuclear facilities.

Title IV of the Clean Air Act Amendments of 1970 is the "Noise Pollution and Abatement Act of 1970". It created an Office of Noise Abatement and Control within EPA which was given authority to carry out a one-year study of the noise problem to identify and classify causes and sources of the noise problem and its effect on human health and welfare.

Probably the most significant piece of Federal legislation enacted in recent years is the Environmental

TABLE 1—ENVIRONMENTAL PROTECTION AGENCY


ADMINISTRATOR
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OFFICE OF FEDERAL ACTIVITIES
OFFICE OF PUBLIC AFFAIRS
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OFFICE OF ADMINISTRATION
OFFICE OF PLANNING & EVALUATION
OFFICE OF RESOURCES MGT.
ASST. ADMINISTRATOR FOR ENFORCEMENT & GENERAL COUNSEL
OFFICE OF WATER ENFORCEMENT
OFFICE OF GENERAL COUNSEL
OFFICE OF GENERAL ENFORCEMENT
ASST. ADMINISTRATOR FOR AIR & WATER PROGRAMS
OFFICE OF AIR PROGRAMS
OFFICE OF WATER PROGRAMS
ASST. ADMINISTRATOR FOR CATEGORICAL PROGRAMS
OFFICE OF PESTICIDES PROGRAMS
OFFICE OF RADIATION PROGRAMS
OFFICE OF SOLID WASTE MGT. PROGRAMS
ASST. ADMINISTRATOR FOR RESEARCH & MONITORING
OFFICE OF MONITORING
OFFICE OF PROGRAM OPERATIONS
OFFICE OF RESEARCH
REGIONAL OFFICES
REGION I BOSTON
REGION II NEW YORK
REGION III PHILADELPHIA
REGION IV ATLANTA
REGION V CHICAGO
REGION VI DALLAS
REGION VII KANSAS CITY
REGION VIII DENVER
REGION IX SAN FRANCISCO
REGION X SEATTLE

Policy Act of 1970. This requires every agency of the Federal Government to take into account, and to make public, the environmental impact of each major action, as well as to discuss alternatives which were considered and which might minimize environmental damage. Already, the procedures of this Act have influenced many projects, and caused the redesign of others, in order to reduce their impact on the environment.

SUMMARY OF MAJOR ACCOMPLISHMENTS

In his message to Congress on the Organization of EPA, President Nixon said: "The Environmental Protection Agency would focus on setting and enforcing pollution control standards."

This task was to be accomplished even though the creative activity of 1970 had moved the country ahead of existing legal tools to rectify specific environmental problems. The existing Federal and State laws and the capability to enforce them were unwieldy.

Although EPA started with some difficult legal machinery, its unified, coordinated approach promised more effective standards and the enforcement of those standards. It also had the benefit of laws just recently passed, such as the Clean Air Act Amendments of 1970.

The Atomic Energy Commission, for example, protected the environment from radiation hazards while at the same time it promoted nuclear power. The Department of Agriculture controlled the use and abuse of agricultural chemicals while simultaneously seeking higher farm yields. Three different departments had roles in the handling and control of pesticides. Such division of responsibility precluded any possibility of a Federally integrated, coordinated approach to the total environmental pollution problems.

In 1971, national ambient air quality standards were set to protect the health of every American citizen. Right now, each State is drafting its plan to implement those standards and achieve the rigid deadlines for the preservation of our air resources. There has been a great deal of discussion about the rigorousness of some of these deadlines. But no matter whether they can be totally achieved in every case, no one can dispute that solid and far-reaching progress is being made in restoring the quality of our air.

EPA also concluded hearings on new auto emission standards. It announced the registration of fuel additives to reduce auto pollution and held a special auto emission control conference in which the Administrator made clear to the industry precisely what he expected of them. The first "clean car" incentive contracts were awarded, and the Army announced the development of an experimental motor vehicle which, it said, meets the 1967 emission standards.

A permit program was inaugurated to regulate the discharge of wastes into navigable waterways and their tributaries within the continental U.S. The Refuse Act permit system is not perfect; the division of administrative authority between several agencies of government is not sound management. The program does not apply to all discharges—only those not discharged through a municipal system; therefore, the permit system is cumbersome and incomplete.

But, based on the limitations of the present state of the law, it is the best system that could be devised, and is a giant step toward cleaner water. For the first time, there will be a Nationwide inventory of industrial waste being discharged directly into our waterways. These discharges will be controlled through the permit program, or its successor in the new water bill; and through this control our water will be protected as never before.

Enforcement of water quality standards and controls through the permit program alone, of course, cannot solve the problem of water pollution. A major part of the problem resides in the fact that most municipal sewage treatment plants are woefully out-of-date. For this reason, a major portion of EPA's budget is earmarked to provide localities with funds for the construction of modern municipal sewage treatment plants, including new experimental pilot plants that might conceivably demonstrate a better, more efficient way of disposing of municipal sewage. A number of these projects have begun to yield results.

An attempt has been made to open up the whole process of determining which pesticides can be tolerated in the environment and for what purposes. Much greater public participation in making a decision, as to what risks are acceptable for what benefits, has been sought. In the new pesticide legislation pending before Congress, the necessary authority has been sought to control the use of any pesticide and, thereby, much more carefully maximize the benefit of a chemical and minimize or eliminate the environmental hazard.

To meet the growing demand for electricity, the utilities are increasingly turning toward nuclear-power stations. As "an advocate of the environment" EPA has direct responsibility to protect the health of the people living near nuclear plants. EPA must also protect the rest of the environment—plants and animals—from any other adverse effects of this activity, such as excessive discharge of waste heat into waterways.

Also, under its review of environmental impact statements authority, EPA studied many such statements prepared by the AEC for various nuclear facilities, and in many cases, was able to effect changes.

EPA was deeply involved in providing financial and technical assistance to the Colorado State Health Department on the problem of a building for which radioactive tailings from uranium mines had been used as construction fill for the foundations.

Three National Environmental Research Centers have been established to conduct on-going studies on the health and ecological effects of environmental contaminants, as well as to pursue the search for technological controls of all forms of pollution. The integrated research program conducted through these centers, and their satellite laboratories, enables EPA to establish environmental standards on the basis of scientifically verifiable data. The research program is beginning to place the Agency in a predictive, instead of reactive, position with regard to environmental protection and the introduction of new elements into our habitat.

Since the beginning of EPA, some major studies were completed on the recovery of municipal waste, which chart a definite course in solid waste management. It is clear that useful basic technology to reprocess municipal waste has been developed. The problem in many applications is not technology, but markets. There are currently no substantial markets for the products recovered by solid waste systems. So, as the Agency works with cities to increase their performance in the collection and handling of wastes at costs they can afford, EPA will concentrate its efforts, as well, on analyzing and recommending ways to increase the demands for resources received from municipal waste.

In a new area of environmental concern, EPA established its Office of Noise Abatement Control. Currently, the Office is evaluating the health hazards of noise and reviewing promising advances in noise suppression technology. Although the major effort thus far has been in the area of aircraft noise suppression, investigations of other noise sources are expected to be substantially broadened. EPA has prepared specific recommendations to Congress on new programs to further combat noise pollution.

The December 2, 1970, stroke of the Presidential pen did not bring an immediate solution to these problems, since at that point, EPA was merely an idea embodied in words on a piece of paper. The job remained to turn that idea into a reality. The existing facilities, programs and people who were to come under the aegis of EPA were scattered throughout the country and the Federal establishment. They, their work and their tools had to be brought together both physically and organizationally. For the first time, their efforts had to be realigned into some kind of coordinated program that reflected the interdisciplinary nature of environmental pollution.

This vast organizational effort, moreover, was complicated by the fact that the urgency of the attack on pollution demanded that vital on-going programs not be disturbed or delayed by the realignment. Indeed, work also had to begin immediately on a host of new programs and initiatives included in EPA's mission.

Internally, EPA started organizing itself to cope with a myriad of interrelated problems. By February of 1971, the Administrator had named five officials as acting Assistant Administrators—three of them in major functional areas: enforcement, research and monitoring, and planning and management; one to supervise the programs concerned with air and water; and one to supervise pesticides, solid wastes and radiation programs.

In that same period, the Administrator also set up 10 Regional Offices along boundaries already in use by other Federal agencies, with the Regional Administrators reporting directly to him. This reflected the Administrator's belief that much of the work of the Agency should be done through the Regional Offices; they would be the "cutting edge" of the Agency's effort. These efforts were the sound foundations upon which real progress depended. EPA has plotted a course in which demonstrable and visible improvement of air, water and land will increasingly occur in the next few years.

The establishment of the Environmental Protection Agency was a landmark decision to replace a haphazard, fragmented approach to environmental quality, with a coordinated, sustained effort to the protection and the enhancement of our atmosphere and living space. By consolidating in EPA the responsibility for research and standard-setting, monitoring and enforcement with regard to six major environmental concerns —air, water, and noise pollution, pesticides, radiation, solid waste disposal—recognition has finally been given to the interrelated nature of environmental problems. There is little sense in removing impurities from the air only to liquefy them and put them in the water, or solidify them and put them on the land. The mandate of EPA is to view the environment as a whole—to be an advocate for its preservation, to be sure that one problem is not aggravated while another problem is solved, and to educate and lead the Nation to a new awareness of peoples' relationship to the delicate balance of life on this planet.

In many ways, what EPA has done since its creation is less important than what it has learned or affirmed about the problems of environmental degradation, and the people and groups who have made a cause of it. What has been learned about society provides invaluable insights into the chances for ultimate resolution of the Nation's environmental difficulties.

LEGISLATIVE INITIATIVES

Although much progress has been made in building a set of laws that are workable and rational, some important legislation requested in last year's Presidential Environmental Message is still before Congress. Other vital legislative programs have been recently proposed. The following list shows the major bills now awaiting Congressional action.

Major Initiatives Still Awaiting Final Legislative Action (1971):

1. Regulation of toxic substances
2. Comprehensive improvement in pesticide control authority

3. Noise control
4. Preservation of historic buildings
5. Power plant siting
6. Regulation of environmental effects of strip and underground mining
7. More effective control of water pollution through a greatly expanded waste treatment grant program and strengthened standard-setting and enforcement authorities
8. A National Land Use Policy Act
9. Substantial expansion of the wilderness system
10. Expanded international cooperation to deal with oil pollution
11. Prevention of oil spills through navigation aids
12. Amendments to Land and Water Conservation Fund

1972 Action Program

Disposal of Toxic Wastes

A Toxic Wastes Disposal Control Act to ensure that the increasing use of land and underground disposal of toxic wastes does not pose a hazard to health. Under the proposed bill, which would amend the Federal Water Pollution Control Act, States would regulate disposal of toxic wastes on and under the land, including "deep well" disposal, pursuant to guidelines established by the Environmental Protection Agency, with a provision for Federal enforcement action if a State fails to establish its own program.

Sediment Control

A Sediment Control Act would call for States to establish regulatory programs to control sediment affecting water quality from earthmoving activities such as building and road construction.

Sulfur Oxides Emission Charge

A charge on sulfur emitted into the atmosphere from combustion, refining, smelting and other processes. The charge is designed to supplement regulatory provisions of the Clean Air Act in controlling sulfur oxides emissions, one of the most harmful of air pollutants. The charge would begin in 1976 and apply in all regions where the air quality did not meet national standards for sulfur oxides during 1975.

A charge of 15¢ per pound of sulfur would be levied in areas failing to meet the primary (health protection) ambient air quality standards established under the Clean Air Act, with a 10¢ per pound charge levied in areas that meet the primary standard but fail to meet the more stringent secondary (damage to property and vegetation) sulfur oxide standards. No charge would be levied in areas meeting both primary and secondary standards.

Clean Energy Generation and Conservation

Eighty-eight million dollars in 1973 budget for additional development of a broad spectrum of new technologies for producing clean energy.

Issuance by the Department of Housing and Urban Development of revised standards for Federally insured apartments and other multi-family structures requiring insulation that will reduce up to 40 percent of heat losses from such structures, with fuel savings exceeding the additional insulation costs within a five-year period.

Council on Environmental Quality and Office of Science and Technology to conduct survey with other Federal agencies to determine additional actions they might take to conserve energy.

Recycling

The Treasury Department is clarifying the availability of tax exempt treatment industrial revenue bond financing for the construction of recycling facilities built by private concerns to recycle their own wastes.

Integrated Pest Management

Research, development, and demonstration programs on integrated pest management, a systematic approach to pest control that involves judicious use of selective chemical pesticides in conjunction with maximum use of natural pest control techniques, such as predators, sterilization and pest diseases.

Expansion of current research and development activities in integrated pest management through a new, large-scale program involving the U. S. Department of Agriculture, the National Science Foundation, and the Environmental Protection Agency, and conducted by leading universities.

Expanded U. S. Department of Agriculture program of field testing of promising new methods of pest detection and control.

Federal encouragement for development of university training programs and State certification of crop protection specialists needed to ensure widespread implementation of integrated pest control techniques.

Expansion of USDA field scout programs to cover nearly four million acres of crops this growing season. This program permits elimination of many unnecessary pesticide applications by using the scouts to determine when such applications actually are needed.

Development of standards by the Departments of Labor and Health, Education, and Welfare under the Occupational Safety and Health Act to protect farm workers from pesticide poisoning.

Increased Research on Pollution

Request in 1973 budget for an increase of $23 million in research to reduce aircraft noise, and new funds to reduce street traffic noise.

Request in 1973 budget for an additional $12 million for research on health effects of pollution, regional air pollution modeling, and improved pollution measurement and instrumentation.

Strengthen Land Use Policy Bill

Amendments to the pending Administration Land Use Policy Bill would require States to control siting of major transportation facilities and impose sanctions on States failing to implement adequate land use programs.

States not implementing adequate programs by 1975 would be subject to incremental seven percent annual reductions in Federal funds allocated to them under the airport and highway assistance programs and the Land and Water Conservation Fund. Funds so withheld would be allocated among States with acceptable programs.

Controlling Development of Wetlands

Amendments to the Internal Revenue Code to limit in coastal wetlands certain Federal tax benefits for new development, thereby discouraging unnecessary development in these environmentally critical areas.

Predator Control

Executive Order barring the use of poisons for predator control on public lands, except in emergencies.

Proposed legislation to shift the emphasis of the current direct Federal predator control program to one of research, technical and financial assistance to the States to help them control predators with means other than poisons.

Endangered Species

New legislation to permit earlier identification and protection of endangered species, so that action can be taken before a species is so depleted that regeneration is difficult or impossible. The new legislation would also for the first time make the taking of endangered species a Federal offense.

Migratory Species

Secretary of State authorized in conjunction with the Department of the Interior to seek agreement with Mexico to add 33 families of birds—including eagles, hawks, owls, and many wading birds—to the protected list established by the two countries.

Legacy of Parks

Legislation submitted to the Congress to create a Big Cypress Fresh Water Reserve, empowering the Federal Government to acquire requisite legal interest in 547,000 acres of private lands in the Big Cypress Swamp in Florida to protect the unique Everglades National Park.

New legislation to establish in the San Francisco Bay region a Golden Gate National Recreation Area, combining a number of existing parks, undeveloped military reservations, and private lands. The area would encompass 24,000 acres of beaches, rugged coastline, and readily accessible parklands; the area would extend approximately 30 miles along the Pacific Coast north and south of the Golden Gate Bridge in San Francisco.

As a result of activities of the Property Review Board, established by the President in 1970, 20 additional parcels of public lands are being made available for park and recreation use. The 20 properties announced today for inclusion in the legacy of parks program include all or portions of the Alvord Estate in Phoenix, Arizona; Camp Elliott in San Diego, California; San Luis Obispo, California; Outer Market Annex, Palm Beach, Florida; Gap Filler Annex, Winter Garden, Florida; Boca Grande Light Station, Gasparilla Island, Florida; Panama City Jetties, St. Andrews Bay, Florida; Federal Correctional Institute, Tallahassee, Florida; Crooked River Light, Carabelle, Florida; Dinner Key Air Station, Miami, Florida; Veterans Administration Hospital, Topeka, Kansas; Veterans Administration Center Reservation, Leavenworth, Kansas; Veterans Administration Hospital, Bedford, Massachusetts; Federal Correctional Institution, Milan, Michigan; Chillicothe Station, Ross County, Ohio; Former Naval Air Station, Tillamook County, Oregon; Roosevelt Roads, Puerto Rico; Fort Hood, Killeen, Texas; Veterans Administration Hospital, Waco, Texas; Fort Douglas, Salt Lake City, Utah.

These 20 parcels constitute 2,853 acres with an estimated fair market value of $4.6 million. Combined with 63 parcels already made available during the past year, this program will provide 14,585 acres of parkland, in 31 States and Puerto Rico with an estimated fair market value of more than $56 million.

Wilderness Areas

Proposal of 18 new wilderness areas that would add 1.3 million acres to the wilderness system. These 18 areas are in addition to 18 areas already proposed by this Administration, and pending before the Congress.

The 18 proposed new areas and their acreages are as follows:

Weminuch, National Forest, Colorado, 346,833 acres
Eagles Nest, National Forest, Colorado, 87,755 acres
Emigrant, National Forest, California, 105,376 acres
Aqua Tibia, National Forest, California, 11,920 acres
Mission Mountains, National Forest, Montana, 73,207 acres
Glacier, National Forest, Wyoming, 182,510 acres
Blue Range, National Forest, Arizona, New Mexico, 177,239 acres
Aldo Leopold, National Forest, New Mexico, 188,095 acres
St. Marks, National Wildlife Refuge, Florida, 17,746 acres
Wolf Island, National Wildlife Refuge, Georgia, 4,168 acres
Moosehorn, National Wildlife Refuge, Maine, 4,598 acres
San Juan Islands, National Wildlife Refuge, Washington, 355 acres
Cape Romain, National Wildlife Refuge, South Carolina, 28,000 acres
Bosque del Apache, National Wildlife Refuge, New Mexico, 32,500 acres
Bryce Canyon, National Park, Utah, 16,303 acres
Black Canyon, National Monument, Colorado, 8,780 acres
Colorado, National Monument, Colorado, 7,700 acres
Chiricahua, National Monument, Arizona, 6,925 acres

TOTAL 1,300510 acres

The Secretaries of Agriculture and the Interior will accelerate identification of areas in the Eastern United States having wilderness potential, in order to increase the opportunities for wilderness experience within the regions where most of our people live.

Off-Road Vehicles

Executive Order directing Secretaries of Agriculture, Interior, Army and the Board of Directors of the Tennessee Valley Authority to issue regulations for controlling the use of these vehicles on Federal lands. Regulations to designate specific areas where their use is or is not permitted, prescribe operating conditions that will be necessary to minimize damage to the natural resources of the Federal lands, and ensure compatability with other recreational uses, taking into account noise and other factors.

United Nations Fund for the Environment

Proposal for a United Nations Fund for the Environment to help stimulate international cooperation on environmental problems, which would bring to bear new resources on worldwide problems through activities such as monitoring and cleanup of the oceans and atmosphere. Recommendation that the fund establish an initial funding goal of $100 million for the first five years, with the United States providing its fair share on a matching basis.

Control of Marine Pollution

The United States is preparing for a 1973 Intergovernmental Maritime Consultative Organization (IMCO) Conference to draft a convention barring intentional discharges to the sea of oil and hazardous substances from ships. In conjunction with the Law of the Sea Conference scheduled for 1973, the United States is examining measures to control the effects of developing underseas resources. In the preparatory work for the 1972 U.N. Conference on the Human Environment, progress has been made on an agreement to regulate the dumping of shore generated wastes, and further work in this area has been scheduled by IMCO.

Protecting Children

In addition to other Federal activities, Department of Health, Education, and Welfare will use grants and technical assistance to initiate programs in more than 50 communities to test children in high-risk areas for lead concentrations.

Youth Programs

The President's Environmental Merit Awards Program, initiated last October by the Environmental Protection Agency in cooperation with the U. S. Office of Education, awards national recognition to successful student projects which lead to environmental understanding or improvement. More than 2,000 high schools throughout the entire 50 States are already participating in the program.

The Department of Agriculture's expanded field scout demonstration program, designed to permit more effective pest control with substantially less pesticides, will employ over 2,000 high school and college students.

The Environmental Protection Agency recently initiated in its Seattle Regional Office a pilot program to use young people in its monitoring and other activities, with the program to be expanded if it proves successful.

ACTION volunteers and youth employed through the Neighborhood Youth Corps, Job Corps and college work-study programs will work with city governments to help alleviate lead-paint hazards.

AIR QUALITY

The American public has become increasingly concerned during the last 20 years about the harmful effects of air pollution on human health, welfare and the quality of life. This concern is reflected in a succession of increasingly more stringent laws, at all levels of government, to control emissions from stationary and mobile sources of air pollution.

The first organized Federal program on air pollution was developed in 1955 when legislation was enacted authorizing the Public Health Service to carry out a modest air pollution research program and to provide technical assistance to State and local governments, which traditionally have had primary responsibility for dealing with community air pollution problems.

In 1963, Congress passed the landmark Clean Air Act. This law authorized financial assistance to State and local governments for the initiation and improvement of control programs, Federal-interstate abatement actions, and the publication of criteria describing the effects of pollution. The law placed special emphasis on gaseous pollutants, particularly exhaust emissions from motor vehicles, and sulfur oxides from stationary sources.

In 1965, amendments to the Clean Air Act gave the Federal program authority to curb motor vehicle emissions. Federal standards were first applied to 1968 model motor vehicles.

The Air Quality Act of 1967 required a new and more comprehensive approach to the problem. It called for the Federal government to designate air quality regions on the basis of meteorological and urban factors, and to publish criteria documents (describing the effects of pollutants), accompanied by related documents on the types and costs of techniques available to carry out source control. Armed with these data, State Governors were required to establish air quality standards and regulating control programs aimed at meeting such standards for designated regions. The work accomplished under the 1967 legislation paved the way for enactment of the Clean Air Act Amendments of 1970, which were signed into law on December 31, 1970.

AIR QUALITY AND EMISSION STANDARDS

The 1970 Clean Air Amendments require EPA to set national ambient air quality standards. In April 1971, EPA promulgated national air quality standards for six common classes of pollutants: sulfur oxides, particulate matter, carbon monoxide, photochemical oxidants, nitrogen oxides, and hydrocarbons. As required under the law, two types of standards have been set: primary standards to protect against damage to public health, and secondary standards to protect against all other damage (property, animals, vegetation, materials, visibility, aesthetics, etc.).

Under the Act, the States must submit implementation plans to achieve the national air quality standards. During 1971, EPA promulgated guidelines to be followed by the States in developing these plans. The guidelines require States to provide for attainment within three to five years, and maintenance of the national standards through the development of air pollution control strategies, which besides the required source emission limitations could include other measures, such as land use and transportation control measures.

State implementation plans also must include emergency action plans designed to prevent significant harm to the health of persons during high air pollution episodes. EPA has defined, for the five most common air contaminants, the levels at which significant harm to the health of persons can be expected to occur. State plans must provide for action designed to prevent significant harm levels from occurring.

In addition, EPA has listed seven specific kinds of legislative authority that will be needed by State air pollution control agencies to meet the requirements of the Clean Air Act. The State air pollution control officials must have authority to:

1. Adopt emission standards and limitations and any other measures necessary for attainment and maintenance of national standards.

2. Enforce applicable laws, regulations and standards, and seek injunctive relief.

3. Abate pollutant emissions on an emergency basis to prevent substantial endangerment to the health of persons.

4. Prevent construction, modification, or operation of any stationary source at any location where emissions from such source will prevent the attainment or maintenance of a national standard.

5. Obtain information necessary to determine whether air pollution sources are in compliance with applicable laws, regulations, and standards,

including authority to require record keeping and to make inspections and conduct tests of air pollution sources.

6. Require owners or operators of stationary sources to install, maintain, and use emission monitoring devices and to make periodic reports to the State on the nature and amounts of emissions from such stationary sources; also authority for the State to make such data available to the public as reported and as correlated with any applicable emission standards or limitations.

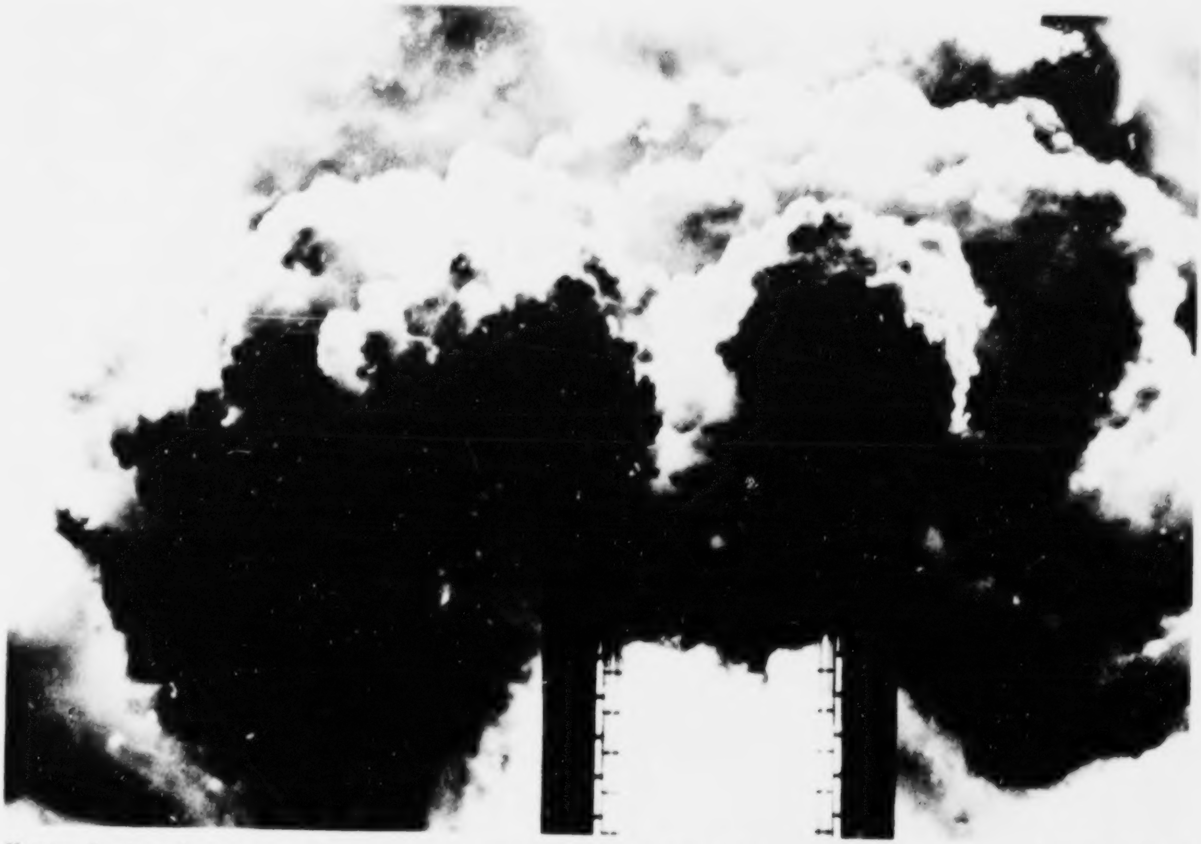
7. Where a plan sets forth a control strategy that provides for application of inspection and testing of motor vehicles and or other transportation control measures, such plan shall set forth the State's timetable for obtaining such legal authority as may be necessary to carry such measures.

8. EPA, under the Act, has important residual enforcement power in the event of failure of a State to perform according to law or regulation.

During 1971, EPA approved portions of 21 regional air pollution control plans for sulfur oxides and particulate matter. The plans were prepared by State governments prior to the Clean Air Act Amendments of 1970. However, the approved portions include regulations for attainment and maintenance of national primary (health-related) air quality standards for particulate matter or sulfur oxides or both. In some instances the plans also provide for the achievement of the national secondary standards for these pollutants. By July of 1972 13 State plans were approved, four plans required additional legal authority within the States and 38 plans are being proposed and promulgated by EPA.

Stationary Sources Emission Standards

Unlike ambient air quality standards, emission standards are limitations placed on the actual sources of pollution. Emission standards are key elements in the State implementation plans. EPA is developing two types of Federal emission standards. The first is a set of standards on especially hazardous air pollutants.



Houston Smokestack pouring out from the burning of old Batteries, Houston, Texas. Documerica Photo which may not be as widely distributed or prevalent as pollutants covered by the State implementation plans. The second is a set of performance standards on industrial operations, which limit the pollution effluent on new or modified industrial facilities to best available and demonstrated control techniques. These standards are designed to prevent pollution as our industrial capability expands.

Proposed emission standards have been published for three hazardous air pollutants. The hazardous pollutants—asbestos, beryllium, and mercury—are the first to be identified as such under the 1970 Clean Air Amendments. The proposed standards would apply to various types of facilities producing, manufacturing, or using these substances or products containing them. Both existing and new plants would be covered.

Hearings on the proposed standards were held during January and February 1972. The standard for each pollutant is scheduled to be made final shortly.

The first group of new source performance standards have been promulgated for steam generators, sulfuric and nitric acid plants, cement plants, and municipal incinerators. The standards are based on capabilities of the best adequately demonstrated emission reduction systems, taking into account the costs. The standards apply primarily to new plants, but also to existing plants which are modified in such a way as to increase or alter the nature of their emissions. In developing these standards, EPA conducted tests of existing sources, consulted industry experts, studied published reports, and considered available information on industrial practices in the United States and abroad.

Two more groups of industries may be covered by proposed new source performance standards during 1972. By that time it is hoped that all the major stationary sources of pollution will be covered by either ambient standards, hazardous pollutant standards, new source performance standards, or a combination of these.

Mobile Sources Emission Standards

EPA has announced several mobile source standards that will provide the 90 percent reduction in the level of auto emissions by 1975-76 required by the Clean Air Act.

Final regulations by which 1975 and 1976 model cars will be judged for their compliance with the Clean Air Act of 1970 were promulgated in 1971, including standards for carbon monoxide and hydrocarbons beginning with the 1975 model year. These would limit emissions to 3.4 grams of carbon monoxide and 0.41 grams of hydrocarbons per vehicle mile. By comparison, allowable emissions from 1970 automobiles were equivalent to 34.0 grams of carbon monoxide and 4.1 grams of hydrocarbons per vehicle mile in terms of the test procedure adapted for use in 1975. The 90 percent reduction in permissible levels is required in the Clean Air Act.

EPA also has promulgated a new exhaust emission standard for nitrogen oxides, which will limit emissions to 3.0 grams per vehicle mile beginning with the 1973 model year. This will be the first Federal limit placed on emissions of nitrogen oxides from motor vehicles. By comparison, emissions from 1971 cars that are not equipped with nitrogen oxides control systems average 4.0 grams per vehicle mile. In addition, the regulations require a further reduction in the nitrogen oxides limit to 0.4 grams per vehicle mile beginning with the 1976 model year. This limitation is in accord with the Acts requirement for a 90 percent reduction in nitrogen oxides by 1976.

The new regulations also provide for changes in the present EPA testing procedure, beginning with the 1975 model year, which will more accurately reflect the driving experience of the motor vehicle population in major urban areas.

EPA has also issued final regulations to require auto makers to provide instructions for the proper maintenance of air pollution control systems. The regulations took effect in the 1972 model year, although their provision for EPA's review of these instructions is not effective until the 1973 model year.

The Clean Air Act authorizes EPA to ensure that motor vehicles remain in compliance with Federal emission standards throughout the vehicle's useful life.

The new regulations define "useful life" as follows:

For light-duty vehicles, five years or 50,000 miles.

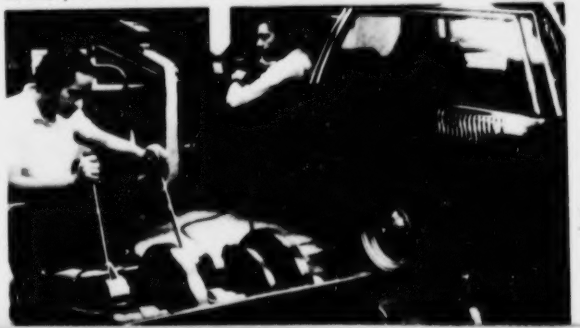
For heavy-duty gasoline engines, five years or 50,000 miles.

For heavy-duty diesel engines, five years or 100,000 miles.

The regulations applicable to maintenance instructions would require manufacturers to provide information on the maintenance of exhaust, crankcase, and evaporative-emission control systems, and on ways to identify and correct malfunctions in those systems.

In May of 1971, EPA conducted public hearings at which domestic and foreign automobile manufacturers were requested to describe their efforts to develop systems to meet the stringent 1975-76 emission limits. The results of these hearings are described in EPA's report to Congress of July 9, 1971, on the development of systems to reduce automobile emissions, and are intended to provide information to assist in determining the feasibility of producing low emission vehicles by 1975.

EPA Federal Laboratory, Ann Arbor, Michigan: Tests begin in the formulation of EPA National Air Standards.



EMISSION CONTROL TECHNOLOGY —STATIONARY SOURCES

During 1971, the research and development program for stationary source air pollution control moved forward on a broad front, toward the goal of developing and demonstrating technology in support of the EPA objective of enforcing and preserving air quality in an economic and timely manner.

A significant part of this effort in line with the President's Energy Resources Message to Congress June 1971, was devoted to continuing work on the large-scale demonstrations of sulfur oxides stack gas cleaning processes. Test programs have been underway since mid-1970 and new tests will begin during 1972.

Work in advanced processes has continued in the development of fluidized bed combustion of coal in limestone as a means of providing low-pollution, low-cost power. Progress is also being made in the planning and laboratory testing of several other advanced systems.

Progress in the area of pollutant control by fuel processing has also been made. The program on physical desulfurization and de-ashing of coal has reached the point where overall potential has been reasonably well established. Further work will concentrate on washability testing, already over 50 percent complete, and will include pilot and demonstration activities on a promising new approach uncovered in work on desulfurization and cleaning of fine coal. A program has been initiated in cooperation with other Federally sponsored fuel conversion projects to undertake pollutant control evaluation and optimization. A new technique for chemical desulfurization of coal was established and work initiated on defining hazardous pollutants contained in fossil fuel.

In the industrial process area, progress has been made in several areas. In the iron and steel industry, the primary problem of controlling pollution from slot-type coke ovens is nearer solution because of the Coke Charging system under a joint, EPA-American Steel Institute project. The system is scheduled to go into operation in mid-1972. Other industrial process demonstrations are in the contract negotiation or development stage, including control of sinter plants, Kraft pulping operations, iron foundries, and secondary aluminum furnaces.

An R & D program to develop combustion modification techniques and technology to control nitrogen oxides emissions was planned and initiated. Although the program is only in its infancy, preliminary results from field testing of utility boilers and in-house studies show that combustion modification is a generally applicable method to significantly reduce nitrogen oxides emissions. Major emphasis is on coal combustion, but the program is designed to develop technology applicable to all fuels and boiler classifications.

EMISSION CONTROL TECHNOLOGY —MOBILE SOURCES

A prototype stratified charge engine being developed jointly by the U.S. Army and the Environmental Protection Agency has met EPA's 1976 emission standards in initial low-mileage tests. EPA and the Army, together with private industry, have been working on this program for the past two years. The test engine is mounted in a one-quarter-ton light truck. A light duty motor vehicle does not fully meet the Federal emission standard until it has demonstrated satisfactory reductions through its useful life. It remains to be seen how well this engine will perform in the durability tests. However, this engine, which is one of three engine systems being worked on as part of the Advanced Automotive Power Systems Program, is the cleanest EPA has ever tested and represents a significant advance in emissions control technology. EPA is increasing its activity on this engine system, hoping to further reduce emissions while maintaining acceptable fuel economies and durability.

Other research on low emission vehicles is being carried out under the Federal Clean Car Incentive Program. This program is intended to stimulate the development by private researchers of unconventional approaches to the initial 1975–76 auto emission objectives of the Clean Air Act, to provide data to assist EPA in evaluating the auto industry's effort to meet those objectives, and to determine whether more stringent emission reductions may be possible. The first contracts to deliver prototype low-emission vehicles for testing under this program were awarded during 1971. The contracts are for the development of a lightweight, diesel-powered vehicle, the exploration of a new approach to catalytic muffler systems for conventional internal combustion engines, and the development of a hybrid system using a heat engine and electric battery combination. The contracts call for delivery of a prototype vehicle and exhaust emission test results, and provide options for EPA to lease the vehicle for testing.

EPA started operations this year of the first Federal laboratory specifically designed for motor vehicle pollution control activities. The laboratory, in Ann Arbor, Michigan, is expected to play a vital role in the Federal Government's efforts to insure a low-pollution automobile by 1975 and in making the tests that are necessary before engines used in automobiles, trucks, and buses can be certified as meeting Federal air pollution control emission standards.

AIR QUALITY MONITORING

Weather stations at 10 U.S. cities have been designated "regional air pollution monitoring stations" in a network that eventually will keep tabs on worldwide air quality.

The National Weather Service, a component of the Commerce Department's National Oceanic and Atmospheric Administration (NOAA), and EPA will cooperate in the measurement and analysis of atmospheric turbidity (particles in the air) and precipitation chemistry (atmospheric impurities in rain or snow). NOAA's Environmental Data Service will store the information and disseminate it in this country and abroad.

To determine current levels of air pollution so that meaningful control strategies can be developed which will result in the national ambient air quality standards being met, it is necessary to have a broad base of data on air quality. Gathering and evaluating these data are tasks that require a joint Federal-State-local effort. To this end, EPA operates its own air monitoring network and also provides extensive support to State and local monitoring activities.

State and local governments have the primary responsibility for maintaining surveillance of air quality in their areas of jurisdiction. Establishment and operation of air monitoring networks are among the purposes for which program grant funds provided by EPA can be used by State and local agencies.

In the guidelines promulgated by EPA in August 1971, for the States in the preparation, adoption, and submittal of implementation plans, minimum requirements were specified that must be met by State air quality surveillance systems as part of their implementation plans. Such systems must be completed and in operation not later than two years after EPA approves the plan. EPA has worked with State and local agencies to evaluate their present systems and to develop plans and schedules for modifying and augmenting them where necessary. Once implementation plans have been submitted and adopted, States are expected to be able to accelerate expansion of their monitoring activities during 1972.

An EPA-developed instrument for measuring ozone, an important constituent of photochemical smog, has come into general use. Because of its ability to operate for long periods without any need for maintenance or recalibration, this instrument has grown rapidly in popularity, until it is now made and sold by a half-dozen domestic manufacturers and at least one overseas.

A second instrument, that has emerged from EPA's laboratories, measures nitric oxide (an important smog-forming gas emitted by all combustion sources, including automobiles) by electronically sensing the radiation generated in its reaction with ozone. Five manufacturers now offer nitric oxide analyzers sufficiently sensitive to respond reliably, even to low levels of this important pollutant.

EPA's instrument development group has further modified its nitric oxide analyzer by adding a catalytic converter that changes nitrogen dioxide into nitric oxide, thus making possible the measurement of "NO_x", jargon for the sum of the concentrations of the two gases. Parallel measurements of NO and NO_x, subtracting the one from the other, provide the analyst with the ability to measure nitrogen dioxide, which is more important from the health aspect.

Following the enactment of the Clean Air Act Amendments of 1970, with its shift of emphasis toward the measurement and control of pollutants at their sources, there has come an increasing awareness that at least, for some time to come, most source measurements will be made by adapting existing instruments, such as those described above, to the task. Because the levels of pollutants to be measured at sources are thousands of times higher than those for which the instruments were designed, a reliable dilution system was required. One such system, with the added advantages of totally removing solids such as soot or fly ash, and of operating without moving parts, was developed by an EPA scientist and is being evaluated both by EPA and by several instrument makers.

Through an interagency agreement with the Atomic Energy Commission, EPA is funding the development of an X-Ray instrument that will permit the rapid measurement of a large number of trace metals occuring in airborn particles. This research will eventually result in field instruments that will permit detailed studies of the occurrence of many metallic and nonmetallic elements in polluted air.

EPA is also supporting an effort at the National Bureau of Standards in air pollution measurement technology. For example, NBS has worked with EPA to develop a method for certification of sulfur dioxide permeation tubes for on-site calibration of monitoring devices. Similar calibration devices for carbon monoxide, nitrogen oxides, and ozone are planned with EPA support.

In fulfilling its mission of recommending measurement methods and instruments to the States and local agencies, EPA has undertaken a major program of methods standardization. An important segment of this program involves the establishment of a laboratory or instrumental method as being "equivalent to", that is, producing the same analytical result when examining the same sample, as a specified standard method.

FINANCIAL AND TECHNICAL ASSISTANCE

In Fiscal Year 1972, EPA estimates of grants to State, interstate, and local air pollution control agencies total $42.9 million, representing an increase of 42 percent over grants made in Fiscal Year 1971. The Regional Activities Chapter summarizes this support for Fiscal Years 1971 and 1972. Amounts shown for each State include grants to local control agencies.

EPA provides technical assistance to States in the adoption and submittal of plans to implement national ambient air quality standards as authorized by the

Clean Air Act Amendments of 1970, including assistance in the development of air quality monitoring systems, emissions inventories, plans for effective enforcement of standards, land use and transportation controls, control regulations, and emergency episode plans. After all implementation plans have been submitted, emphasis will shift to insuring that States carry out the plans.

In addition to direct technical assistance, EPA has contracted with 10 consulting firms, one serving each of the 10 EPA Regions, to assist States in preparing plans on an on-call basis. These companies are capable of completing all phases of implementation plans, from emission source inventory to recommending abatement schedules. Many States took advantage of this source to assist them in meeting the requirements of the 1970 Amendments.

THE ECONOMICS OF CLEAN AIR

Section 312(a) of the Clean Air Act Amendments of 1970 requires an annual report to Congress on the prospective costs and impacts of governmental and private efforts to carry out the provisions of the Act. The 1972 report includes cost estimates, computed for the first time on a national level, for controlling major air pollutants from most (but not all) stationary and mobile source types. For mobile sources three pollutants are covered: carbon monoxide, hydrocarbons and nitrogen oxides. For stationary sources five pollutants are covered: particulates, sulfur oxides, carbon monoxide, hydrocarbons, and nitrogen oxides. Three general classes of stationary sources are considered: solid waste disposal (open burning and incineration), stationary fuel combustion (heating and power generation), and industrial processes (17 types). Mobile source types studied include light duty and heavy duty road vehicles only. Stationary source control costs are projected for the five Fiscal Years 1973–1977. Mobile source control costs are given for the 1968–1977 model years to show the relative impact of increasingly more stringent Federal standards since 1967. In 1972, uniform emission standards were selected without going through the various steps of emission inventories and diffusion calculations to determine acceptable emission standards for achieving air quality standards in each air quality control region. The basis for the selections was the sample limitation procedures promulgated in the *Federal Register*, Volume 36, Number 158, Part II, "Requirements for Preparation, Adoption, and Submittal of Implementation Plans", August 14, 1971.

Estimated Costs of Reducing Air Pollution

A private outlay of about $35 billion is estimated over the period of Fiscal Years 1973–1977 to implement the stationary and mobile source emissions reductions postulated in the 1972 study. Mobile source controls are projected to cost $24.7 billion for the 1973–1977 model years ($26.9 billion for the 1968–1977 model years). The cost of controlling the stationary source types is projected to be $10.1 billion. All cost estimates are in 1970 dollars.

Table 2 compares the source emission reductions likely to be achieved in Fiscal Year 1977 under assumed emission standards with potential emissions from these

Barham Blvd
Lankershim Blvd 2
Ventura Blvd 2

Hollywood Freeway 8:30 A.M.

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source types if no controls were implemented beyond those normally found in practice.

The Fiscal Year 1977 costs of the control technology likely to be used by the sources studied are given both as total investment in that year (purchase plus installation cost) and as annualized cost (capital charges plus operating and maintenance costs). Federal, State and local subsidies (accelerated amortization, investment tax credit, etc.) have not been considered in calculating private industrial emission control costs.

TABLE 2.—National Emission Reductions and Costs Under Assumed Standards for Fiscal Year 1977 (Cost in 1970 Dollars) [1]

Source Class Type	Emission Level without further control [2] (Thousands of Tons per Year)					Emission Reductions and Cost Under Assumed Standards						
						Decrease of Emission Level (Percent) [2]					Total Control Cost (Millions of Dollars in FY 77) [3]	
	Part	SO_x	CO	HC	NO_x	Part	SO_x	CO	HC	NO_x	Investment	Annual
Mobile Sources [4]	450	1,490	165,000	28,000	9,900	[4]	[4]	66	72	44	$ [7]	$ 8,385 [7]
Solid Waste Disposal	**1,830**	**260**	**6,720**	**2,530**	**510**	**96**	**0**	**92**	**86**	**0**	**$ 472**	**$ 224**
Stationary Fuel Combustion:												
Small & Intermediate boilers	2,330	7,660	—	—	4,800	84	83	—	—	0	$ 879	$ 1,116
Steam-electric power	5,600	27,600	—	—	6,000	49	90	—	—	0	$ 4,660	$ 1,360
TOTAL	**7,930**	**35,260**	**—**	**—**	**10,800**	**72**	**88**	**—**	**—**	**0**	**$ 5,539**	**$ 2,476**
Industrial Process Studied:												
Asphalt Batching	403	—	—	—	—	86	—	—	—	—	$ 272	$ 63
Cement	908	—	—	—	—	93	—	—	—	—	$ 89	$ 35
Coal Cleaning	342	—	—	—	—	97	—	—	—	—	$ 21	$ 9
Grain Plants: Handling	1,430	—	—	—	—	93	—	—	—	—	$ 395	$ 83
Feed	362	—	—	—	—	94	—	—	—	—	$ 19	$ 4
Gray Iron Foundries	260	—	—	—	—	88	—	94	—	—	$ 348	$ 126
Iron and Steel	1,991	—	—	—	—	96	—	—	—	—	$ 841	$ 306
Kraft (Sulfate) Pulp	536	—	—	—	—	85	—	—	—	—	$ 132	$ 40
Lime	609	—	—	—	—	94	—	—	—	—	$ 29	$ 7
Nitric Acid	—	—	—	—	230	—	—	—	—	89	$ 37	$ 14
Petroleum Products & Storage	—	—	—	1,349	—	—	—	—	78	—	$ 378	$ 73
Petroleum Refineries	241	3,010	12,100	197	—	59	99	99	94			
Phosphate	350	—	—	—	—	54	—	—	—	—	$ 31	$ 15
Primary Nonferrous Metallurgy:												
Copper	314	3,335	—	—	—	9	84	—	—	—	$ 313	$ 100
Lead	39	213	—	—	—	33	89	—	—	—	$ 65	$ 16
Zinc	71	555	—	—	—	0	75	—	—	—	$ 41	$ 18
Aluminum	49	—	—	—	—	89	—	—	—	—	$ 923	$ 256
Secondary Nonferrous Metallurgy	34	—	—	—	—	83	—	—	—	—	$ 32	$ 9
Sulfuric Acid	38	920	—	—	—	74	81	—	—	—	$ 169	$ 39
TOTAL	**7,977**	**8,033**	**15,900**	**1,546**	**230**	**86**	**89**	**98**	**80**	**89**	**$ 4,135**	**$ 1,213**
Industries Not Studied	10,150	1,530	9,750	1,610	—	0	0	0	0	0	$ 0	$ 0
Miscellaneous Sources Not Studied [5]	7,940	280	19,740	7,750	5,250	0	0	0	0	0	$ 0	$ 0
National Total [6]	**36,280**	**46,850**	**217,110**	**41,440**	**26,690**	**39**	**81**	**57**	**17**	**60**	**$10,146**	**$12,298**

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[1] Standards assumed in the 1972 Report to Congress, "The Economics of Clean Air." Blanks in the table indicate that emission levels meet applicable regulators or that emissions are negligible or do not exist.

[2] Emission abbreviations are: particulates (Part), sulfur oxides (SO_x), carbon monoxide (CO), hydrocarbons (HC), nitrogen oxides (NO_x).

[3] Projected costs are the initial investment expenditures for purchasing and installing control equipment (total investment) and the continuing annual costs for interest, property taxes, insurance, depreciation, etc., and for operating and maintaining of equipment (ultimate annual cost). Cost of government programs is not included.

[4] Includes light duty and heavy duty road vehicles only. Control of particulate and sulfur oxides from mobile sources was not considered in this study.

[5] Forest fires, structural fires, solvent evaporation, agriculture burning, natural gas production and transmission, coal refining, etc.

[6] To nearest 10,000 tons.

[7] All mobile source emission control investment costs are assumed to be expended in Fiscal 1977. Annual costs are based on Alternative 1 in Table 3-3 for meeting 1975 and 1976 vehicle emission standards.

The aggregate price impact of private investment in air pollution control is projected to result in less than a one percent cumulative increase in consumer prices through 1977, with over half of the increase caused by a 10 percent rise in the price of new automobiles. Other key price increases projected are four percent for electric power, and 2.5 percent for iron and steel, cement, and sulfuric acid. The remaining projected industrial price increases are 1.5 percent or less.

An examination of the impact on families of different income levels indicates that middle income groups would be affected relatively more than low or high income groups.

New construction is the investment activity most heavily affected by projected price increases. New public utility construction is affected most because of increased prices for copper, electricity, iron and steel, iron castings and passenger cars and trucks. Higher passenger car and truck prices will increase investment costs for transportation. Projected price increases will also raise prices for machinery, electric industrial equipment and apparatus and communications equipment.

Export prices for agriculture products, chemicals and chemical products and passengers cars and trucks would increase, but the net impact on exports and balance of payments is difficult to predict because the relationship of demand to projected price increases is unknown.

Thus, the net adverse economic impact of the stipulated air pollution controls is projected to be small.

Benefits of Air Pollution Control

The direct and indirect costs of pollution control should be judged in comparison with the direct and indirect costs of the damage which could be mitigated by such control.

Quantitative scientific information on the extent of damage caused by these pollutants to health and welfare is substantial enough to indicate the need for Federal, State, and local abatement programs, but still far short of the level of detail needed to assess monetary damage costs with the same precision as control costs. Nevertheless, it is possible to develop crude estimates of the pecuniary costs of air pollution damage to health, materials, vegetation, and property values. Extrapolating from data presented in a 1970 study by Barrett and Waddell[1] for the Public Health Service, the total U.S. emission levels, without application of the standards assumed in the 1972 report, imply direct costs of human mortality and morbidity in the neighborhood of $9.3 billion annually, and damage to property values around $8 billion annually, for a total annual damage cost of about $25 billion by 1977. The extrapolated damage costs are given in Table 3. The Barrett-Waddell study did not include health costs ascribable to CO, HC, NO_x, and oxidants (O_x) because of an almost complete lack of data upon which to base any estimates. (Oxidants are irritant components of smog produced in the atmosphere by the interaction between HC, NO_x, and sunlight.) When, in addition, the as yet unestimated pecuniary costs of air pollution effects on industrial, commercial, and cultural property, esthetics, visibility, odor, soiling, etc., are considered, the $25 billion total appears rather conservative.

TABLE 3.—Projected National Annual Damage Costs[1] By Pollutant in 1977 (1970 Dollars in Millions)

Damage Class	Pollutant					Total
	Part.	SO_x	O_x [2]	NO_x	CO	
Health	$3,880	$ 5,440	$ [3]	$ [3]	$ [3]	$ 9,320
Residential Property	3,330	4,660	[3]	[3]	[3]	7,990
Materials and Vegetation	970	3,680	1,700	1,250	0 [4]	7,600
TOTAL	**$8,180**	**$13,780**	**$1,700**	**$1,250**	**$ [3]**	**$24,910**

[1] Based on "The Cost of Air Pollution Damages: A Status Report" by Larry B. Barrett and Thomas E. Waddell, Public Health Service, Department of Health, Education and Welfare, July 1970.

[2] Assumed proportional to HC emissions.

[3] Not available due to lack of data.

[4] Assumed to be negligible.

Table 4 attributes projected 1977 damage costs by source class, assuming strict proportionality between the total weight of a pollutant emitted by a source class (Table 2), and the damage cost of the pollutant assigned to the source class in Table 3. On this basis, stationary fuel combustion ranks as the most damaging source class, while solid waste disposal (incineration) is the least damaging.

TABLE 4.—Projected National Annual Damage Costs[1] By Source Class in Fiscal 1977 (1970 Dollars in Millions)

Source Class	Damage Class			Total	Percent
	Health	Residential Property	Materials and Vegetation		
Mobile	$ 220 [2]	$ 190	$1,740	$ 2,150	8.6
Solid Waste	230	190	200	620	2.5
Stationary Fuel Combustion	4,950 [3]	4,240	3,650	12,840	51.5
Industrial Processes Studied	1,780	1,530	920	4,230	17.0
Industries Not Studied	1,260	1,080	460	2,800	11.2
Miscellaneous	880	760	630	2,270	9.1
TOTAL	**$9,320**	**$7,990**	**$7,600**	**$24,910**	**100.0**

[1] Based on "The Cost of Air Pollution Damages: A Status Report" by Larry B. Barrett and Thomas E. Waddell, Public Health Service, Department of Health, Education and Welfare, July 1970.

[2] Health damage costs due to CO, NO_x, and O_x not included due to lack of data. Entry is health damage cost ascribed only to minor amounts of vehicle-related particulate and SO_x and, therefore, considerably understates probable costs.

[3] Health damage costs due to NO_x from stationary fuel combustion not included due to lack of data.

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[1] "The Cost of Air Pollution Damages: A Status Report" by Larry B. Barrett and Thomas E. Waddell, Public Health Service, Department of Health, Education, and Welfare, July 1970.

It should be understood that this method of allocating damage cost by source class assumes that a unit of emission of a certain pollutant from one source is as uniformly damaging as a unit of emission of the same pollutant from another source. In the case of mobile sources, it is possible these assumptions considerably understate attributable health damages. This possibility derives from the fact that auto exhausts are so near to people's breathing level and autos are so concentrated where urban populations walk, work, and drive.

If reductions in damage are equated to benefits, then it is possible to compute from the foregoing assumptions and data a crude estimate of the value of benefits obtained from the emission reductions summarized in Table 2. Table 5 gives the projected national annual benefits (damage cost reduction) attributable to these emission reductions in Fiscal Year 1977. Under the assumptions made, computed total benefits in 1977 of $14.2 billion are generated by the $12.3 billion estimated to be spent in that year for emission control—a benefit/cost ratio of over one-to-one. When it is considered that due to lack of data the value of the health benefits generated by reductions in CO, O_x, and NO_x, has not been included in Table 2, then the one-to-one benefit/cost ratio appears conservative.

The lack of data on the health costs of CO, O_x, and NO_x seriously biases the results in Table 5 against the efficacy of mobile source emission controls. However, in 1977, without the controls mandated by the Clean Air Act, mobile sources would produce nationally 76 percent of national O_x (smog) formation.

Research sponsored by EPA now underway is expected to lead eventually to better data for ascribing damage costs to different pollutants and their interactions. Presently, however, the assignment of damage cost to pollutants lacks a solid empirical basis. Accordingly, the cost-benefit results presented above should be considered as very tentative.

TABLE 5.—Projected National Annual Benefits (Damage Cost Reduction) By Source Class in Fiscal 1977 (1970 Dollars in Millions)

	Benefit Class				
Source Class	Health	Residential Property	Materials and Vegetation	Total Benefit	Control Cost (Table 1-1)
Mobile	[1]	[1]	$ 945	$ 945 [1]	$ 8,385 [3]
Solid Waste	172	145	119	436	224
Stationary Fuel Combustion	3,812 [2]	3,267	$2,366	9,445	2,476
Industrial Processes Studied	1,413	1,302	734	3,350	1,213
Industries Not Studied	0	0	0	0	0
Miscellaneous [4]	0	0	0	0	0
TOTAL BENEFIT [4]	$5,397	$4,615	$4,164	$14,176	$12,298

[1] Value of benefits from reducing CO, NO_x, and HC emissions not available due to lack of data.

[2] Health damage cost due to NO_x from stationary fuel combustion not included due to lack of data.

[3] Based on Alternative 1 in Table 3-3 for meeting the 1975 and 1976 vehicle emission standards.

[4] Benefit computation based on proportional reduction of damage costs in Table 1-3 excluding "miscellaneous" source damage costs since these are generally not controllable and, therefore, can not become benefits.

Consideration of Other Abatement Strategies

In August 1971, EPA published guidelines for the States in developing regional abatement implementation plans for achieving the national ambient air quality standards for the pollutants studied in this report. The emission reductions simulated in the 1972 report are based on the same emission limitations given in the guidelines, but no attempt was made to relate these reductions to regional changes in air quality.

Ideally, strategies could be developed which achieve the national ambient air quality standards by the legal deadlines at the least net cost to the region affected. To do this, however, requires a detailed emission inventory of sources in each region where the ambient air quality standards are violated plus very detailed information on the cost and efficiency of control techniques and fuels available to those sources. The use of computerized meteorological dispersion models would then be needed to translate emissions from these sources into average concentrations at points within the region where standards are being violated Once the meteorological importance of each source to these points is estimated and the cost to each source to achieve certain levels of emission reduction is also estimated, it would be possible to compute the set of source emission reductions which achieves the air quality standards at "least cost" to the region. The "least cost" approach to achieving national air quality standards will require that some sources abate their pollution to different degrees than others because of differences in location and process efficiency.

The emission controls for stationary sources assumed in the 1972 report are probably more representative of strategies expected to be proposed in State abatement implementation plans than any other set of controls which could be postulated for a nationwide estimate. Yet in many cases the actual regional approach implemented will be less expensive than that assumed in this report, and in a few selected regions more costly methods will be employed and still not succeed in reaching air quality standards by 1975.

In some regions the critical pollutants are those associated with mobile sources. New car emission standards are set nationally, but options available to a State in controlling pollution from mobile sources include adopting policies to encourage and support urban mass transportation systems and to discourage the current heavy reliance on private automobiles, requiring retrofit of in-use automobiles with effective emission control devices, requiring conversion of private and public fleets to cleaner gaseous fuels, instituting state systems for inspection of proper operation of mobile source emission controls and improving urban traffic patterns.

WATER QUALITY

Almost any day, in the United States, the signs of water pollution in large population centers and in the countryside can be seen. Pollution may appear as surface oil slicks, in which old tires, debris and picnic remnants are trapped and float sluggishly by, or evidenced by public health notices warning the citizen not to swim or wade in the water. Pollution may be manifested in less obvious ways by masses of aquatic weeds and bad taste in the drinking water supplies. Even more subtle will be the often unseen-changes in the aquatic life of the river, the loss of sport fish and increase of sludge worms and other "tolerant" life-forms such as carp.

This urban example is repeated throughout the Nation. As society and economy have grown, the wastes generated by population and technology have increased. Population growth is a principle pollution factor. In 1971, the Nation's population was well past the 200 million mark. This number of people is expected to double in the next 50 to 60 years. Staggering demands will be placed on our natural resources to support this population. Waters are needed for consumptive purposes, such as non-recycled public water supply, food production and processing, and some industrial uses, as well as for non-consumptive uses, such as reaction, industrial cooling, and sport and commercial fishing. As demands for water will increase, so will the production of wastes that threaten the environment.

Not only the rate but the pattern of population growth concentrates and magnifies pollution. Urban and suburban sprawl covers green spaces and reduces clean environment in the very areas where people most need it. Intensive development has occurred particularly along the Nation's coastlines, in the very estuarine areas most sensitive to environmental degradation. In the President's 1972 Environmental Message special attention is given to these areas. Amendments are proposed to the Internal Revenue Code to limit in coastal wetlands certain Federal tax benefits for new development, thereby discouraging unnecessary development in these environmentally critical areas.

Higher individual incomes and expectations have led to increasing demands for food and consumer goods, for more and better housing and highways and for a whole range of conveniences. In most cases, production of wastes is "built-in" to technology; as industrial production increases, with attendant demands for water, so does the per capita production of wastes, many of which find their way to the waterways.

Consumer use and production of goods have greatly increased the demand for electric power—power production has doubled every 10 years since World War II, and this rate is expected to continue. Great amounts of water are used in producing electricity, and waste heat from both fossil fueled and nuclear generating plants constitutes a serious, and increasing, threat to the Nation's waters.

Not only is the volume of industrial production increasing, but the very complexity of the products and wastes creates severe challenges for waste treatment technology. New chemical products appear on the market every day, often without sufficient research into the environmental consequences of using them.

Mining and transporting natural resources also pose increasing dangers for the environment. Greater use of supertankers and pipelines to transport oil and hazardous materials, as well as increasing use of offshore and underwater mining, will greatly increase the dangers of accidental oil pollution and other hazards.

The growing popularity of deep well disposal of wastes presents yet another serious threat to water resources. Although carefully controlled deep well injection may contribute to groundwater management, improperly carried out, this method of disposal may result in contamination of groundwater or interconnected surface water supplies. A proposed Toxic Wastes Disposal Act would regulate disposal of toxic wastes on and under the land pursuant to guidelines established by EPA.

Production of greater quantities of better quality food for American citizens has caused increasing pollution problems. Higher agricultural productivity has been based on irrigation and use of chemical fertilizers and pesticides. Runoff carries salts and chemicals, many of which are highly toxic and have long-lasting environmental effects, into streams. These diffuse waste sources are most difficult to control or treat. The possibility of irreparable and disastrous ecological consequences, particularly from persistent pesticides, has led to increasing demands for controlling or eliminating their use; no one can predict with certainty the impact of such a move on agricultural productivity.

EPA is developing an index to evaluate water pollution. This index uses data which measures deviations from established standards for water quality as a basis. It describes bodies of water with respect to prevalence, duration, and intensity of water pollution.

In 1970, an assessment of the prevalence of pollution indicated that 27 percent of America's stream miles were polluted. In 1971, 29 percent of the Nation's waters were polluted. Although the assessed prevalence of water pollution in 1971 indicated an increase, differences in the methods and data used in the calculation make comparisons difficult.

Every part of the U.S. has some water pollution, but it is not distributed uniformly. In 1971, there were almost twice as many polluted stream miles east of the Mississippi River than west of it.

The 1971 pollution index considers the duration and intensity as well as the prevalence of pollution. The relative water pollution of the Federal regions, in Table 6 is not significantly changed when the frame of reference shifts from prevalence of pollution to one of prevalence, duration, and intensity.

The distribution of pollution becomes more apparent when the focus is shifted from political to natural drainage basin boundaries. The degree to which water pollution is concentrated now becomes evident. Three Basins (Ohio, Southeast, and Great Lakes) contain 23 percent of the nation's stream miles, but 49 percent of the polluted stream miles (Table 7). Extensive pollution is very nearly limited to the Ohio, Great Lakes, and Southeastern drainage systems, and though the Northeastern watersheds are in a class with the other three, with respect to duration and intensity of pollution, they tend to dominate that measure as well.

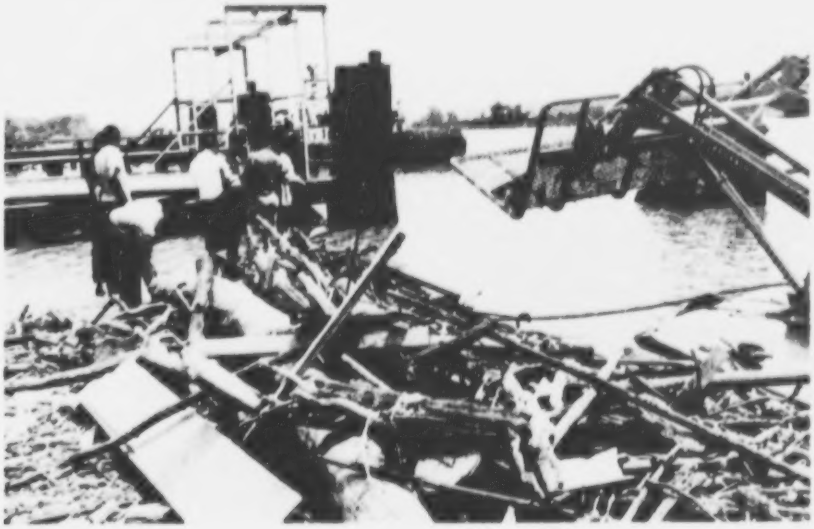
On the basis of the available data, of the four apparently significant shifts in reported pollution that took place in the Ohio, Gulf, Missouri, and Northeastern Basins—three are so obscured by variations in procedure that it is difficult to evaluate the degree of real change. Both the Gulf and the Missouri Basins reported an enormous improvement in compliance with water quality standards. But in each case, the 1970 assessment failed to make allowance for legally sanctioned breaches of water quality criteria that resulted from precipitation; and in both cases, that exception is significant. In the case of the Ohio River Basin, the 1970 assessment concentrated on the quality of major waterbodies overlooking smaller tributaries. But in Ohio many streams are polluted at the source as a result of acid drainage of mountain coal mines. Failure to account for this total prevalence of pollution in 1970 is at least partly responsible for the increase in reported pollution in 1971. Thus the conclusion is that substantially the same number of river miles were polluted in 1971 as in 1970.

It should be noted that the line of water pollution does seem to be holding in face of rising population and industrial production. Also, while national statistics do not indicate a marked change in water quality, some individual water bodies have been notably improved, e.g. Lake Washington. In coming years, as comparable data are developed, the water pollution index will be able to better identify trends in water pollution for the Nation.

WATER QUALITY STANDARDS

Federal enforcement authority on interstate and navigable waters has been strengthened over the years since initial enactment of the Federal Water Pollution Control Act in 1956. The most significant increase in these authorities stemmed from the Water Quality Act of 1965, authorizing the establishment and enforcement of water quality standards for interstate and coastal waters.

The water quality standards authorized by the 1965 legislation are the keystone of America's clean water



Washington, D.C.: Debris collected from the Potomac and Anacostia rivers by students.

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Washington, D.C.: Debris collected from the Potomac and Anacostia rivers by students.

program. The Act called upon the States to establish standards for their interstate waters. These State standards could then be accepted as Federal standards by the Secretary of the Interior (now by the Administrator of the Environmental Protection Agency). To set standards, the States had to make crucial decisions involving the desired uses of their water resources, the quality of water to support these uses and specific plans for achieving such levels of quality. The standards are, in effect, blueprints for the national program.

Water quality standards are composed of three parts: those uses that are designated for each separate stretch of interstate or coastal waters, the criteria established to assume that these uses will be attained and a plan of implementation and enforcement which outlines the pollution abatement measures which will be required to meet those criteria. First responsibility for implementing and enforcing water quality standards rests with the States. But, once accepted by the Administrator, the standards become Federal standards and are subject, if necessary, to Federal enforcement. In the absence of timely and acceptable action by a State to adopt water quality standards on interstate streams, the Administrator can initiate action to establish Federal standards. Heavy emphasis has been placed on resolving differences so that State standards can be fully approved. Negotiations have been underway with the States concerned, and a number of States have agreed to complete their standards.

Even where standards have been approved, there is a need to refine and improve certain aspects of the water quality criteria to assure that the criteria applied will adequately protect the intended water uses. Continued emphasis must be given to improving our knowledge of water quality characteristics and requirements and incorporating this information in approved criteria.

TABLE 6.—Relative Incidence of Water Pollution

EPA Region	Pollution Index	Percent of Miles Polluted	Duration Intensity Factor	Duration–Intensity as a Percent of U.S. Mean	Percent of Polluted Miles
I Boston	.10	16.4	.624	153	6.4
II New York	.10	42.4	.448	111	2.7
III Philadelphia	.20	34.7	.579	142	11.7
IV Atlanta	.17	37.9	.455	112	19.4
V Chicago	.28	64.5	.427	105	24.3
VI Dallas	.98	21.5	.367	90	13.1
VII Kansas	.04	12.5	.329	81	3.1
VIII Denver	.06	25.0	.233	58	7.4
IX San Francisco	.07	23.5	.204	72	5.2
X Seattle	.02	19.4	.108	26	7.2
Contінguous U.S.	.12	29.3	.408	100	100
East of Miss. River	.19	38.5	.482	118	63.9
West of Miss. River	.06	20.6	.275	67	36.1

WATER QUALITY MONITORING

Effective implementation and enforcement of water quality standards, development of regional and basin plans, administration of grants and preparation of reports assessing costs of pollution control and abatement progress require up-to-date, accurate and readily available data. This has always been a requirement, but the need has intensified with the establishment and implementation of water quality standards and the resulting necessity of identifying priorities in waste treatment facility construction.

Thus, EPA has been expanding its data collection activities to identify compliance and noncompliance with water quality standards; improvements in water quality resulting from pollution abatement measures, such as waste treatment facility construction; and emerging water quality problems that should be corrected before crises arise.

TABLE 7.—Water Pollution Index Summarized for Major Drainage Areas, 1970 & 1971

Major Watershed	Stream Miles	Polluted Miles 1970	Polluted Miles 1971	Polluted Miles Change	1971 D.I Factor	Index 1970	Index 1971
Ohio	28,992	9,869	24,031	+13,746	.423	.14	.35
Southeast	11,726	3,109	4,490	+ 1,381	.744	.20	.28
Great Lakes	21,374	6,580	8,771	+ 2,191	.445	.14	.18
Northeast	32,431	11,895	5,823	— 6,072	.609	.22	.11
Middle Atlantic	31,914	4,620	5,627	+ 869	.472	.07	.08
California	28,277	5,359	8,429	+ 2,499	.270	.05	.08
Gulf	64,719	16,605	11,604	— 5,001	.346	.09	.06
Missouri	10,448	4,259	1,839	— 2,420	.306	.12	.05
Columbia	30,443	7,443	5,685	— 1,758	.116	.03	.02
U.S.	**260,324**	**69,739**	**76,299**	**+ 5,435**	**.408**	**.11**	**.12**
U.S. Less Ohio	231,332	59,870	52,268	— 8,311	.401	.10	.09
U.S. Less Columbia	229,881	62,296	70,614	+ 7,193	.431	.12	.13

A portion of a coordinated State/Federal water quality monitoring network is already in operation. It presently utilizes approximately 400 stations funded and operated by EPA, 220 stations funded by EPA, and operated by the U.S. Geological Survey, 200 stations jointly funded and operated by the State and Federal agencies, and 5000 State-funded and operated stations. Data from this network will be supplemented by the findings of the many short-term intensive field studies of specific water quality problems that are conducted by EPA.

In addition to water quality data, detailed knowledge of waste sources, treatment and discharges is also necessary. Municipal sewage and industrial wastes are the two largest sources of pollutants. EPA completed the processing and analysis of data on municipal waste facilities which was collected in a cooperative Federal-State inventory. Because the need for timely and accurate data in this area is so critical, procedures were developed and implemented for keeping the inventory updated. Data from the implementation plans of the water quality standards are being correlated to and integrated with the inventory to show schedules for providing additional municipal waste disposal facilities.

As for industrial wastes, an inventory of industrial manufacturing and processing plants has been initiated on a voluntary basis to obtain data on discharges other than those into navigable waters.

Again, data from the implementation plans of the water quality standards will be a valuable addition to the inventory. This inventory, like that of municipal facilities, will be continuously updated.

With the recent and pending water pollution control legislation, data on waste sources and discharges have become even more important. States are required to show that a proposed municipal facility is a part of, and in conformity with, a basin, regional or metropolitan pollution control plan before the project is declared eligible for a construction grant. Regulations also prescribe the provision of data on all waste discharges

TABLE 8.—Water Quality Standards Approved Under the Federal Water Pollution Control Act, as Amended

(as of February 1972)

State	Status	Approval Dates
Alabama	P	2/15/68
Alaska	FA	2/20/68 10/05/71
Arizona	FA	9/27/68 1/17/69
Arkansas	FA	8/07/67 11/19/69
California	FA	1/09/69 1/26/72
Colorado	FA	10/21/68 10/09/69 3/04/71
Connecticut	FA	2/15/68 4/21/70
Delaware	FA	3/13/68 7/30/71
Florida	FA	1/17/69
Georgia	F	7/18/67
Hawaii	FA	3/13/68 6/28/71
Idaho	FA	8/07/67 2/15/68 6/07/71
Illinois	PA	1/27/68
Indiana	FA	7/18/67 1/20/71
Iowa	FA	1/16/69 6/30/71
Kansas	FA	4/25/69 3/05/71
Kentucky	FA	3/20/69 12/23/71
Louisiana	PA	2/12/68 12/17/69
Maine	FA	6/03/68 12/12/68 3/02/71 7/30/71
Maryland	FA	8/07/67 7/16/71
Massachusetts	FA	8/07/67 11/25/70
Michigan	PA	4/17/68
Minnesota	FA	6/18/68 11/25/69
Mississippi	P	5/06/68
Missouri	FA	2/08/68 6/26/68 7/30/70
Montana	FA	2/29/68 1/17/69
Nebraska	FA	12/19/68 6/25/71
Nevada	FA	6/27/68
New Hampshire	FA	8/16/68 12/01/70
New Jersey	FA	3/13/68 7/26/71
New Mexico	FA	7/09/68 11/19/68 8/21/69

TABLE 8.—Water Quality Standards Approved Under the Federal Water Pollution Control Act, as Amended (Continued)

State	Status	Approval Dates
New York	FA	7/18/67 7/26/71 8/07/67 3/04/71
North Carolina	FA	5/16/68 1/20/71
North Dakota	FA	8/07/67 5/22/70
Ohio	PA	3/04/68 9/13/68 1/02/69
Oklahoma	FA	2/28/68 2/17/70
Oregon	FA	7/18/67 9/13/68 12/17/68 1/16/70
Pennsylvania	FA	5/21/68 10/07/71
Rhode Island	FA	1/30/68 11/19/68 1/20/71
South Carolina	FA	10/21/68 4/21/69 12/23/71
South Dakota	FA	8/07/67 6/28/71
Tennessee	P	2/28/68
Texas	FA	1/27/68 5/02/69
Utah	FA	12/31/68
Vermont	FA	6/27/68 8/24/71
Virginia	FA	1/17/69 2/22/71
Washington	FA	1/22/68
West Virginia	FA	5/21/68 7/30/71
Wisconsin	FA	1/24/68
Wyoming	FA	11/27/68
District of Columbia		4/17/68
	FA	1/17/69
Guam	FA	6/12/68
Puerto Rico	FA	12/30/68
Virgin Islands	FA	2/28/68 4/28/70

Legend:

FA—Fully approved water quality standards—antidegradation statement included	46
F—Approved water quality standards—antidegradation statement not included	1
PA—Partially approved water quality standards—antidegradation statement included	4
P—Partially approved water quality standards—antidegradation statement not included	3

STATUS SUMMARY

	States
Fully approved with antidegradation statement (FA)	46
Standards approved wholly or in part	54
Approved antidegradation statement	50

in the immediate proximity of a proposed plant which may affect its design and operation. For these reasons, additional data will be required on wastes characteristics and strengths.

In addition to the municipal and industrial inventories, a new collection effort has been initiated to provide data on thermal discharges from electric power generating plants. By agreement with the Federal Power Commission, data for this inventory are collected by that agency through a questionnaire on the environmental control information.

To achieve the objectives of a coordinated information program, it is essential that the data collected be evaluated and made available to all users. EPA's existing computerized data Storage and Retrieval system (STORET) makes these data available for analyses and use by both State and Federal organizations.

Quantitative analyses of changing trends in water quality, and of the progress in abating pollution nationwide, will be essential in guiding the course of the national water pollution control effort. It will also contribute to the assessment of national environmental conditions and trends required under the National Environmental Policy Act of 1969 by indicating whether we are gaining or falling behind in pollution control.

BASIN AND REGIONAL PLANNING

Basin and regional water quality management planning are essential in pollution control. They are directed at protecting both the private and public investment interests in water quality through attainment of the water quality standards in a cost effective manner.

Clean water will be achieved only by controlling present and future wastewater discharges in river basins. It must be insured that these results are lasting; that actions today are adequate to meet the needs of the future; and that provision is made for the future growth of population and industry.

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Discharge from Denver Metro Sewage Treatment Plant into South Platte River, Denver.

For these reasons, water quality management planning is a major element not only of the water program, but also of the total national effort for environmental enhancement. EPA participates not only in the water and related land resource planning programs of the Federal establishment, but joins with local and State government in their development of water quality management plans both in river basins and regional areas.

At the Federal level, EPA's water planning activities are mainly of two types. The first type, participation in the general planning for the development of the water and related land resources in entire river basins, is normally conducted under the aegis of the Water Resources Council. In this type of study, EPA's mission is to assure that not only water quality, but all environmental aspects, receive due recognition in the development of the Nation's land and water resources.

In addition to Federal basinwide resources planning activities, EPA reviews proposed water resources projects on an individual basis to assure that these projects do not have an adverse effect on the environment. Storage for water quality may be included in many Federal reservoirs but only after the best practical methods of treatment of wastes is undertaken.

EPA assists State and local government in their development of water quality management plans for river basins and regional areas. These plans provide the basis for the public investment to construct water treatment facilities. (See the Regional, State, and Local Activities chapter for more information.)

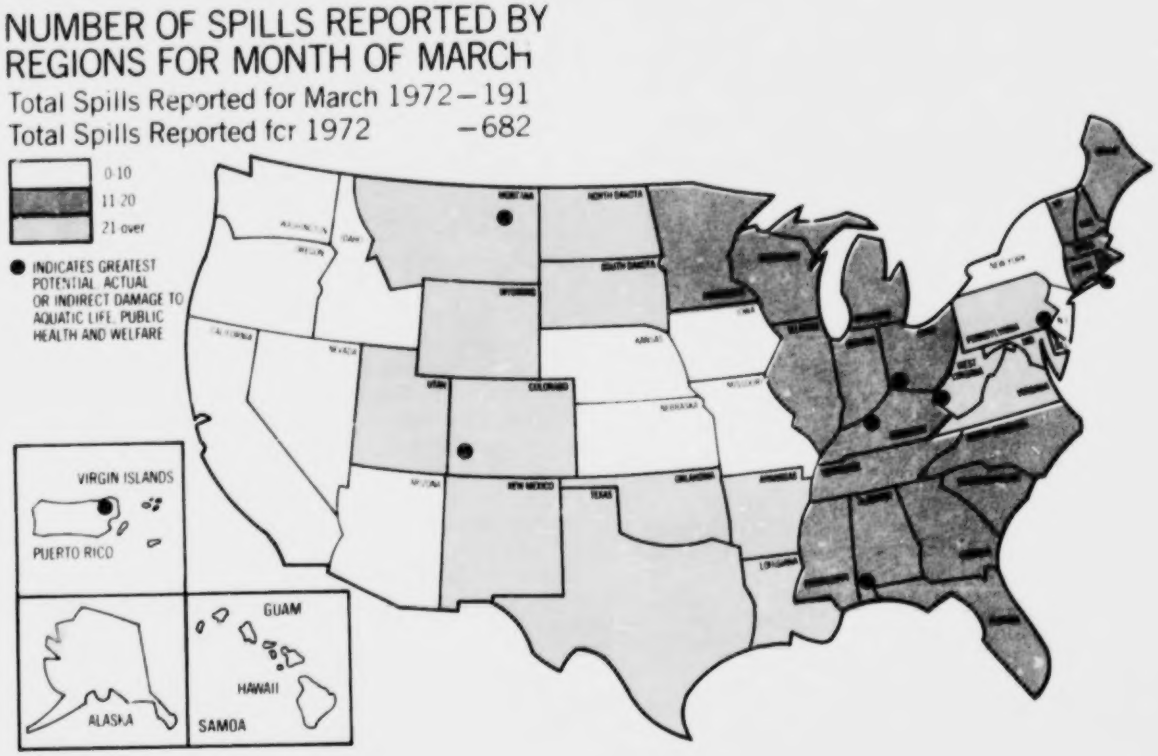
In order to maximize the effect of Federal assistance in planning at the State and local level, EPA has implemented a formal agreement with the Department of Housing and Urban Development and an informal working arrangement with the Farmers Home Administration through which EPA's planning guidelines are used by these agencies. The aim is to assure that Federal programs avoid duplication of effort and provide quicker service to State and local entities.

Mathematical models are the basis for an effort to provide nationwide river basin models for planning purposes. In order to stimulate the States' interest in whole basin systems rather than individual projects, the models will be tailored to simulate those water quality parameters deemed most important in each basin now and in the future.

Planners will use the models to predict the effects on water quality of alternative wastewater management schemes in the basin. By analyzing alternatives the planners can select a cohesive comprehensive plan for the basin to provide cost effective answers to such questions as treatment, sophistication, staging of wastewater treatment controls, possibilities of regionalizing treatment facilities, effects of proposed impoundments on water quality, effect of nonpoint sources of wastes throughout the system, potential for algae problems in an estuary and a host of others.

This effort is using the expertise within EPA, joining

TABLE 9.—Number of Spills Reported by Regions for Month of March


NUMBER OF SPILLS REPORTED BY REGIONS FOR MONTH OF MARCH
Total Spills Reported for March 1972 – 191
Total Spills Reported for 1972 – 682
0-10
11-20
21-over
● INDICATES GREATEST POTENTIAL, ACTUAL OR INDIRECT DAMAGE TO AQUATIC LIFE, PUBLIC HEALTH AND WELFARE
VIRGIN ISLANDS
PUERTO RICO
GUAM
HAWAII
ALASKA
SAMOA

Federal and State forces in a coordinated attack on some massive planning problems and stimulating the application of modern techniques by State and local planners to act effectively to protect and revitalize the Nation's essential water resource. Basins and regional plans provide a blueprint for both meeting present pollution abatement problems and avoiding similar problems in future years.

OIL AND HAZARDOUS MATERIALS

Over 10,000 spills occur annually in the navigable waters of the U.S. Spills are defined as non-continuous discharges or dumping which occur as a result of accidents, malfunctions of equipment, human error, deliberate discharges of bilge or ballast water and convenience dumping of hazardous materials and oil into sewers, streams, estuaries or coastal waters.

Approximately 75 percent of the spills involve petroleum products and include crude oil, refined products ranging from grease to gasoline and waste lubricating oil. In the last year, over 2000 significant spill incidents occurred and those account for about 90 percent of the total volume of oil spilled. It is estimated that over 15 million gallons of oil were discharged.

Sources of Oil Spills
(1970 Data)

	% of total number	% of total volume
Vessels	33	14
Onshore Facilities	19	59
Offshore Facilities	24	26
Other	24	1

The remaining 25 percent of the spills involve hazardous materials which include poisons, corrosive materials, oxidizing agents, radioactive materials, and other compounds and mixtures which severely affect the aquatic environment. Specific materials include creosote, ammonia nitrate, combined pesticides and insecticides, chromic acid, isopropyl alcohol, polyethylene latex, and zinc cyanide. The toxicity of individual substances is the critical factor to be considered.

For both oil and hazardous materials the source of the discharges is linked to transport, transfer, storage, manufacturing and production operations. The goals of EPA are to eliminate the spills, reduce discharges resulting from operational practices and minimize the impact of spills on the environment. To accomplish these goals, a three phase program has been developed by EPA and the Department of Transportation largely through the U.S. Coast Guard and the Office of Pipeline Safety which includes response, prevention and enforcement.

In this regard the National Oil and Hazardous Substances Pollution Contingency Plan has been revised and updated to reflect the role of EPA during emergencies involving spills. In accordance with the Plan, EPA maintains the lead role in providing advice on environmental priorities, cleanup techniques and serves as on-scene coordinator for inland spill incidents. EPA is also responsible for continuous updating and revision of the National Contingency Plan and for providing a Chairman for the National Response Team.

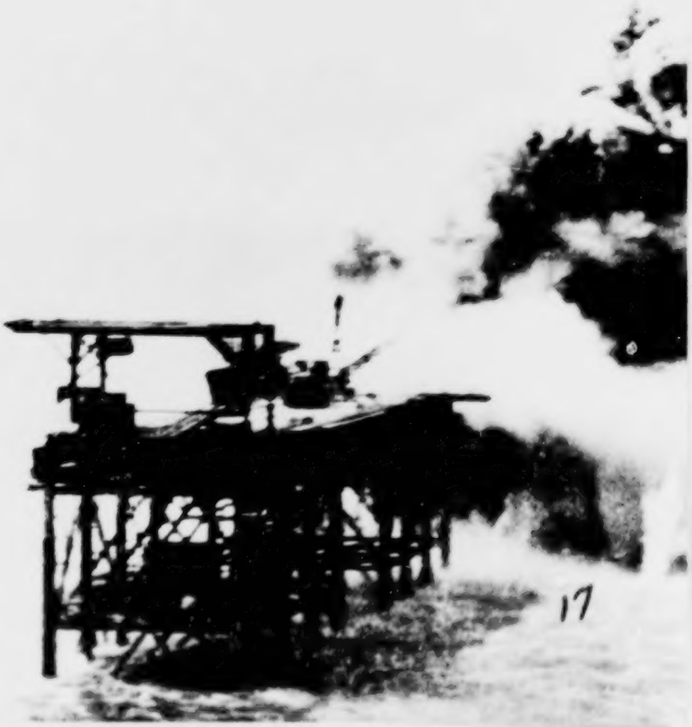
Initiation of EPA's ability to respond to a major oil spill occurred just as it was formed. On December 1, 1970, a production well on a Shell Oil Company platform exploded, igniting adjacent wells. An estimated 4,000,000 gallons of oil were spilled during a period of 4½ months. This major disaster resulted in the loss of four lives, the destruction of millions of dollars in equipment and immeasurable damage to the environment. EPA continuously provided technical assistance to the U.S. Coast Guard and the U.S. Geological Survey in addition to the conduction of extensive assessments of biological damage. The *Arizona Standard* and the *Oregon Standard* collided under the Golden Gate Bridge during a heavy fog. About 20,000 barrels of oil escaped along the coastline and into the Bay proper. EPA assembled a team of scientists to investigate and document the extent of environmental damage. An emergency response contract was activated to provide remote sensing coverage of the oil spill.

On June 2, 1971, EPA, at the request of Ohio, provided direct support in the removal of endrin (a highly toxic pesticide) which had been deliberately dumped into a small lake near Portmouth, Ohio. The endrin destroyed all aquatic life in the lake and had the potential to prevent the use of the lake for years unless all traces were removed. EPA provided the expertise, design and construction of a carbon absorption filter which treated the lake water and removed the endrin.

On June 20, 1971, after an agricultural chemical warehouse fire, EPA received a request from North Carolina to provide emergency assistance for the removal of a mixture of pesticides and herbicides trapped in drainage ditches and a swamp. Immediate action was required because of the toxic fumes surrounding the area, residual chemicals in the destroyed foundation, and the potential of seepage into a nearby public water supply well. EPA's expertise was provided

New Orleans, Louisiana 3/10/71: Oil leaks from offshore wells.

New Orleans, Louisiana: A dynamite blast extinguishes an oil well fire.



enabling the successful treatment and disposal of the material at an isolated and sealed burial site.

In addition to response actions by regional teams, EPA established emergency response contracts with six technical firms to provide support to Regional Offices during major spills. EPA was to provide assistance in conducting chemical, physical and biological studies and performing remote sensing services. These services were activated on five occasions during the past year.

During 1971, EPA has provided on-scene coordination or advice on 60 percent of the major incidents. The continuing success of the response program is dependent upon rapid action at the State and local levels. Many coastal States now have response programs, and EPA is encouraging all States, local agencies and port authorities to develop similar programs. EPA published criteria to aid States, municipalities and industries in preparing emergency planning.

It is estimated that during 1971 over 12 million gallons of oil remained in the environment and less than one percent of the hazardous materials spilled were removed or mitigated. Greater emphasis must be placed on rapid action by the discharger and more effective cleanup methods. Regulations specifying methods and procedures for removal of oil and hazardous materials are being developed. In order to disseminate current research information EPA co-sponsored, along with the American Petroleum Institute and the U.S. Coast Guard, the 2nd Conference on Prevention and Control of Oil Spills which was held in Washington, D.C., on June 15–17, 1971.

The positive solution of the spill problem is through prevention. Regulations to prevent oil spills from non-transportation related facilities are currently being developed by EPA. Emphasis has been placed on fail-safe design concepts to minimize human error and reduce equipment failure.

A special prevention study by industries at four major industrial areas was completed in February. This report has served as the basis for development of an EPA prevention program to reduce spills by requiring industries which handle, store, manufacture and trans-

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In March, 1972, a barge carrying liquid chlorine became stuck to the McAlpine Dam at Louisville, Kentucky, and could not be set free. If the tanks on this barge were punctured the liquid chlorine would be turned into a poisonous gas that could devastate Louisville. In the days that followed, the E.P.A. along with the Coast Guard, the Army Corps of Engineers and local groups fought this accidental environmental crisis.

port oil and hazardous materials to submit a spill prevention plan. This program is being carried out through the Refuse Act Permit Program. A special provision is included in selected industry permits which requires that a plan be submitted for approval by EPA.

A study was completed by EPA, the District of Columbia, Maryland and Virginia to evaluate the oil handling practices in the Washington area and to initiate a prevention program. A similar study of Baltimore Harbor was jointly funded by EPA and Maryland to determine the sources, causes and steps to be taken to eliminate spills of both oil and hazardous materials. Although the primary efforts of EPA have been directed to response and prevention of spills in U.S. navigable waters, significant steps have been taken at the international level to reduce discharge and spillage into the oceans and boundary waters. In the U.S./Canadian Conference on Great Lakes Pollution, two studies were completed involving response to and prevention of spills. EPA provided the sub-group chairman for the study on prevention of spills from onshore facilities and served on the committees for development of a joint U.S. contingency plan and prevention methods for vessels.

EPA provides input to the Inter-Governmental Maritime Consultative Organization (IMCO) and its Marine Pollution sub-committee. With IMCO's expanding role to prevent operational and accidental discharges of oil and hazardous materials into the oceans, EPA's efforts have been increased to provide guidance at the international level to ensure compatibility of international criteria with that of the U.S.

In the coming months, emphasis will be placed on promulgation of removal and prevention regulations. These regulations, together with the provisions of the 1970 Water Quality Act relative to the reporting of oil and hazardous materials spills, the penalties for illegal discharges of oil, the penalties for failing to comply with regulations and the liabilities for the cleanup of oil spills, will be actively enforced.

Contingency plans at the Regional, State and local levels will be updated and refined in order to integrate new technological concepts associated with detection, surveillance, prediction, containment, cleanup and disposal of oil and hazardous materials. Federal, State and local agencies will be encouraged to develop contingency plans within the coming year.

Response to hazardous materials spills will be strengthened. A technical advisory group on hazardous materials will be formed and consist of experts in toxicology, biochemistry, medicine and other related fields to study the problems of personal safety and the threats to public health.

With the promulgation of the oil prevention regulation, an active program will be initiated for non-transportation facilities. Efforts will be directed toward post-spill inspections to determine compliance with regulations and the Corps of Engineers Permit Program prevention schedules. Offshore facilities will require special review to insure compliance with regulations.

"Fail-safe" design requirements are essential to the development of an effective program. Analysis studies will be continued for facilities and Federal installations handling, storing, manufacturing and transporting oil and hazardous materials. Findings will be used to prepare guidelines, regulations, manuals and model codes.

EPA training seminars have been held and are necessary at a local level to keep abreast of new technology to minimize discharges. This program will provide a constant exchange base for new technology.

On a continuing basis EPA will participate in international activities dealing with tanker operations, design, ocean dumping, designation of hazardous materials, technology transfer, and other related programs. Through the Department of State, advice and assistance will be provided to other countries and operational programs, such as those with Canada and IMCO.

WATER SUPPLY PROGRAM

EPA is responsible for conducting a series of activities designed to promote an adequate supply of safe drinking water for all Americans. These activities include the establishment of standards for potable water. The standards apply directly to over 600 water supply systems serving interstate carriers (trains, planes, busses, and vessels). These systems also serve a resident population of 80,000,000 people.

As of July 1, 1971, there were 658 water supply systems serving interstate carriers. Five hundred and twenty-nine of the systems were in general compliance with the federal drinking water standards and classified as approved. One hundred and twenty-nine systems were not in compliance with the standards. However, the deficiencies were not sufficient to prohibit their use, and they were therefore approved on a provisional basis. During 1971, seven supplies were classified use-prohibited due to serious violations of the drinking water standards.

Although Federal enforcement action, taken through the Food and Drug Administration, is limited to prohibiting interstate carriers from using supplies which may cause the spread of communicable disease, most States have adopted the standards and apply them to all community water supplies.

EPA conducts evaluations of State water supply programs at the request of the States. The findings and recommendations are used to upgrade State programs. In 1971, an evaluation of Tennessee was completed and similar evaluations were initiated in Maryland, Kentucky, New Mexico, Wyoming and Idaho.

EPA is conducting a series of pilot studies of Federally-assisted water supply systems to determine their adequacy and safety. A study has been completed on water supplies constructed by the Corps of Engineers at recreational areas in Ohio and Indiana. A similar study has been initiated on a series of Bureau of Reclamation water supplies in Kansas, California and along the Colorado River. Plans have been developed to study water supply systems serving the travelling public along Federal interstate highways in Virginia, Oregon and Kansas.

A pilot study of bottled water has also been conducted, and a report of findings is being prepared. In addition to conducting studies, EPA provides a program of training and technical assistance to upgrade water supply systems. A variety of courses is available at the National Environmental Research Center in Cincinnati. Selected courses are conducted at various field locations.

EPA makes federal funds available to aid the construction of new or improved municipal sewage treatment plants and experimental pilot plants. These grants are explained in the Regional, State, and Local Activities Chapter.

In 1971, a survey was conducted to update EPA estimates of the scope and cost of construction of municipal waste treatment facilities, planned through Fiscal Year 1976—which are needed to meet current water quality standards implementation schedules, or other current standards or enforcement requirements.

The survey was directed to 2294 municipalities whose population was greater than 10,000 persons, or whose facilities were serving more than 10,000 persons. The estimated total cost of constructing needed waste treatment facilities for the five-year period Fiscal Year 1972 through Fiscal Year 1976 for these municipalities is just over $14 billion. This estimate is based on 1971 construction costs and excludes the cost of needed combined sewer overflow control facilities. When the construction needs for communities less than 10,000 are included, then the total cost of projects planned over the period Fiscal Year 1972 through Fiscal Year 1976 reaches $18.1 billion.

ASSISTANCE PROGRAMS

Technical assistance is another key program available to help States solve pollution problems. A great many of the water pollution problems facing the Nation call for technical study to determine the sources or causes of the pollution and to find the most appropriate abatement measures to remedy the situation. Often, the problem is complex and requires extensive field and laboratory study. Acid mine drainage, coastal and estuarine pollution, groundwater contamination, and pesticide and toxic chemical pollution are examples of pollution problems for which the most effective and appropriate corrective action is frequently unknown and for which specific technical study is necessary before abatement action can be pursued.

EPA assists the State, interstate and other water pollution control agencies and individuals in developing their technical capabilities and provides financial assistance for this purpose through program grants. These agencies conduct a great many technical investigations required to carry out an effective water pollution control program, but frequently they find it necessary to call for outside assistance to handle problems, or parts of a problem, which exceed their capabilities. To meet these needs, EPA provides technical assistance of various kinds ranging from technical advice and consultation to extensive, long-term field and laboratory studies. Within the limits of available resources, this assistance is provided on request, primarily to the State and interstate water pollution control agencies, but also to other public agencies, including other Federal agencies, and individuals.

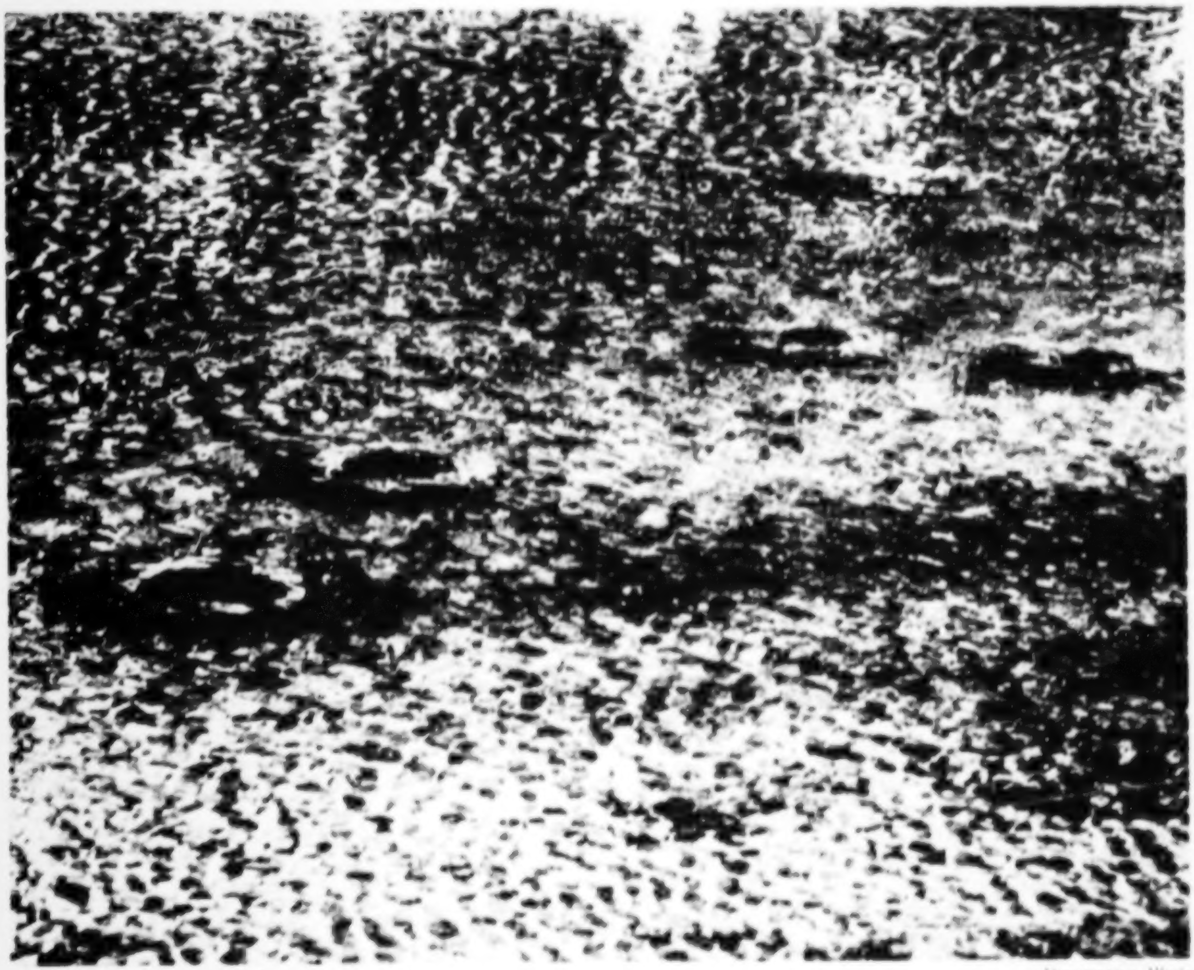
During 1971, EPA responded to over 55 major requests for technical assistance and innumerable requests for advice, information, reviews and comments on technical problems.

EPA operates both a voluntary fish kill reporting system and an emergency fish kill response system. Examples of assistance available to State agencies investigating a fish kill are field investigation, sample analysis and autopsy of fish to establish cause of death.

Abatement and control of industrial sources of water pollution in 1971 involved development of effluent information guides for 20 basic industrial categories, the application of advanced waste treatment techniques, guidelines for review of Refuse Act Permits, a voluntary national industrial waste inventory, and technical support for enforcement, standards compliance and the Justice Department's pursuit of legal actions against polluters. In 1972, effluent guideline development will continue with emphasis on types of industry not previously studied. Criteria are being developed for ocean and deep well disposal. Expertise will be used to review Refuse Act Permit applications, the implementation of effluent monitoring, ocean disposal permit review, assistance in upgrading wastewater treatment and technical support to enforcement actions.

In 1971, technical assistance to State, interstate and local agencies, and to universities, industry and individuals accounted for approximately 20,000 technical assistance acts. These include:

> EPA's application and implementation of demonstration and research findings by other agencies and the mining industry concerning mine drainage.
>
> Projects in the control of Animal Wastes, Irrigation Return Flows and General Land Runoff, Highway Construction and Land Development Wastes, Logging and Forestry Wastes and Problems with Rural Sanitation Facilities.
>
> A National Eutrophication Control Program has begun which involves a field survey of the extent of eutrophication in 1,200 lakes of the U.S. The survey also includes the use of questionnaires. The other aspect of the program is the implementation



Tires discarded in Lake Tahoe.

Documerica Photo

of methods to control the extent of eutrophication in lakes and impoundments. The means of controlling eutrophication is by reducing the amount of phosphorus entering into the water bodies, primarily through upgrading or constructing treatment facilities.

A program designed from the National Estuarine Pollution Report to maintain the national data base needed to combat estuarine, coastal, and oceanic pollution problems effectively, to assist States in developing effective attacks on such pollution, and to support enforcement and research directed at such problems. This program includes an oceans islands project to combat unique pollution problems in these particular ecosystems.

Efforts in preventing freshwater pollution are continuing. Upgrading and development of criteria, technical assistance, special Great Lakes and eutrophication control programs, deep well disposal, and surface and ground waters are areas of vital concern.

Another important part of technical assistance to State and local governments is the Manpower Development and Training Program. EPA's main objective in manpower is to assure that there is enough skilled manpower, both professional and sub-professional, in all sectors of the economy to meet EPA's mission to abate and control pollution. All of EPA's program activities require trained manpower to accomplish their goals. Thus, EPA must assure that manpower in requisite numbers and skills are available at the times and places needed to get the job done. The intention of this objective is not that EPA should build massive programs to train and supply all manpower needs. Rather, EPA should provide leadership and develop programs to fill the unmet needs.

ECONOMICS OF CLEAN WATER

EPA has been conducting a series of economic studies aimed at gaining deeper understanding and assisting the Executive Branch and the Congress in formulating national policies and legislation. Studies have been undertaken and are continuing to provide estimates for the total municipal and industrial costs for achieving current water quality standards. Areas included in the studies are combined sewer and storm overflow control costs; effluent guideline cost criteria; and costs of non-point sources of pollution including mining, oil spills, agriculture and thermal and radioactive discharges from power plants. Collectively, these studies represent the most intensive and comprehensive effort ever made to understand the costs of water pollution control.

The findings of EPA's economic studies are submitted to Congress annually. The first report projected municipal investment requirements for the period 1969 to 1973 and assessed the impact of funding required to meet municipal waste treatment needs on the municipal governments and bond markets. The second report examined the influences that determine investment levels and concluded that the critical factors were to be found in the dynamics of the situation, in the interaction of investment with time-conditioned growth, replacement, and demand for higher plant efficiencies. It was also found that regional cost differences, transmission costs, and the influence waste loadings were extremely important factors in analyzing the economics of water pollution control.

Various aspects of the socio-economic problems of water pollution were presented in the second report. These included discussions and conclusions about investment trends and needs, Federal cost sharing, priority systems for grant funds, public treatment of industrial wastes and regional waste handling systems. In addition, several estimates discussed in earlier reports were reviewed in view of the latest available information. These included investment estimates for collecting sewers, separation of storm sewers, industrial waste treatment and cooling facilities, and sediment control and acid mine drainage reduction.

The Water Quality Improvement Act of 1970 required that a complete investigation and study of all methods of financing the cost of water pollution control, other than methods authorized by existing law, be made and the results submitted to Congress by December 31 of each year. To meet this requirement, EPA structured a study which dealt with pollution sources of all types including, but not limited to, municipal, industrial, agricultural, land and acid mine drainage, oil and accidental spills and debris. Questions of responsibility, ability to pay and equity were addressed in allocating potential funding requirements among the private sector and the various levels of government. The study examined the feasibility of a wide range of financing possibilities in the light of the analysis outlined above. Potential methods included conventional financing; loan arrangements; user, influent and effluent charges; taxation; insurance-type arrangements and others. In addition, potentials for reducing financing requirements by means of structural policy alternatives were assessed.

The Economics of Clean Water 1972 further investigates the methods and means for financing the costs of water pollution control, concentrating on industrial water use, discharge and treatment. The report analyzes the use of water by industry as a raw material; outlines the major assumptions and data sources for the calculation of industrial waste treatment costs; presents the range of capitalization levels and annual costs that have been calculated to coincide with levels of industrial effluent treatment dictated by current interpretations of water quality standards; evaluates treatment currently provided to industrial wastes by industry-supplied and public waste treatment plants; and, finally, assesses manufacturers' waste treatment investments since 1968, projects investments and annual costs consistent with a policy of full compliance with effluent standards by 1976, and relates those costs to annual cash flow and prices of manufactured goods. The following are some specific results of the most recent Economics of Clean Water 1972.

Industrial—Capital Expenditures

The costs (in billions of 1971 dollars) of the components of the level of industrial waste treatment as of 1968 are:

Total capital required to meet quality standards		$8.1
Available capital stock as of 1968		$3.9
Industrial treatment	$2.4	
Public waste treatment serving industry	$1.5	
Unmet capital demands as of 1968		$4.1
Unmet capital demands as of 1971		$3.0

These figures as presented in Table 10 are broken down by industrial categories. Capital requirements are distributed through the various manufacturing sectors in a manner that strongly reflects their water use characteristics and has only a slight correlation with output values. Chemical manufacturers, primary metals production, pulp and paper production, petroleum refining, and food processing account, respectively, for 27 percent, 18 percent, 17 percent, 12 percent and 11 percent of the indicated investment, and 29 percent, 32 percent, 15 percent, nine percent, and five percent of reported water intake. That there is a concentration of water use within industries is shown by the fact that 85 percent of the capital requirement associated with water pollution abatement comes from only a little more than a third of values added by manufacturers.

These figures are current as of 1968 and are only an approximation because data are reported on industrial investment in a manner that will not permit direct correlation with the calculations made in this report. The $3.9 billion of works-in-place as of 1968 appears to represent about 50 percent of the waste treatment required by water quality standards with, however, enormous variation in degree of compliance to be found between one industry and another.

The above figure of $8.1 billion to cover capital requirements dictated by current interpretations of water quality standards was obtained by use of an industrial cost model. Industrial waste treatment costs (Table 10) are dependent on flow volumes, residuals characteristics, waste segregation opportunities and available technology. Such considerations are generalized for industrial categories and then evaluated on the basis of reported flows and flow to cost relationships, in order to calculate treatment costs for such treatable discharge. Such treatment costs may vary greatly depending on the efficiency with which abatement procedures are applied in any given plant, even within an industry. Although the most likely level of capitalization is about $8.1 billion, it could be as high as $12.2 billion.

In the eventual resolution of the industrial waste handling situation, it is not likely that the maximum investment of $12.2 billion will occur under existing abatement requirements. The association of capital requirements with water use practices has enormous implications for the dimensions of ultimate costs. Higher treatment costs, other things being equal, are a direct consequence of wasteful use of water. Water is wasted largely because it has had many of the characteristics of a free good. Imposition of a wastewater treatment requirements—or other cost-incurring constraints on water utilization—will, it has been demonstrated both in theory and in practice, lead to production practices that are less water-intensive, and thus have lower associated waste treatment values.

Several modifications of the evaluation model were attempted in order to arrive at a realistic assessment of capital requirements. One took into account the modification of water utilization practices that accompanies installation of waste treatment as well as hardware and construction costs. Without altering the relationships among treatment process components, water use coefficients were substituted for the observed ones—though all substitutions were made by recourse to observed conditions—and investment and annual cost calculations were produced to reflect the altered variables. The most likely investment level ($8.1 billion) is thought to be the one associated with "median" efficiency.

Industrial—Annualized Costs

The initial capital cost of facilities represents less than a fourth of the total cost of industrial waste treatment. Once installed, facilities must be operated and maintained. Given the composition of the set of treatment requirements evaluated here, operation and maintenance accounts for 35 percent of the annual cost. Interest, at current rates, accounts for a large share of annual charges for waste treatment. Some 40 percent of the annual costs of the modelled treatment sys-

TABLE 10.—Industrial Waste Treatment Situation Summary, 1968

		MILLIONS OF 1967 DOLLARS					
SIC	INDUSTRY	Capital Supplied		Median Requirement	Deficiency	Maximum Requirement	Deficiency
		By Industry	Publicly				
20	Food & Kindred Products	193.8	315.3	913.3	404.2	997.5	488.4
22	Textiles	48.8	63.6	234.8	122.4	251.4	139.0
24	Lumber & Wood Products	9.7	2.3	115.8	103.8	186.1	174.1
26	Paper & Allied Products	529.5	79.3	1235.6	626.8	1550.5	941.7
28	Chemicals & Allied Products	343.2	191.5	867.6	332.9	2436.8	1902.1
29	Petroleum & Coal	342.1	7.1	817.4	468.2	1096.1	746.9
30	Rubber & Plastics	3.0	22.7	82.9	57.2	96.0	70.3
31	Leather	17.0	17.3	86.5	52.2	86.8	52.5
32	Stone, Clay & Glass	20.0	22.0	156.5	114.5	182.3	140.3
33	Primary Metals	216.3	125.9	1089.8	747.6	1620.5	1278.3
34	Fabricated Metal Products	6.7	51.4	99.9	41.8	124.1	66.0
35	Machinery	14.8	48.8	80.7	17.1	100.1	36.5
36	Electrical Equipment	23.8	92.2	113.5	(2.5)	129.5	13.5
37	Transportation Equipment	17.4	92.3	79.8	(12.5)	122.7	13.0
	Manufacturing	1787.0	1131.7	5964.2	3045.5	8965.7	6047.0
	(1971 dollars)	(2425.0)	(1535.7)	(8093.4)	(4132.7)	(12166.4)	(8205.8)

tem, and 27 percent of the annual costs of the system of works that industry reported to be in operation in 1968, can be attributed to interest payments implicit in the value of the capital stock. To make the sequence of major and minor replacement expenditures required to sustain the stock of physical capital, the firm faces a continuing capital demand, one that is estimated to equal the capital cost within a 20-year period, and to account for 25 percent of the annual costs of the modelled system of waste treatment works. The annual costs (operation, maintenance, debt service, and replacement) associated with the $8.1 billion capital investment requirement is $1.6 billion. The annual cost associated with the higher $12.2 billion figure is $2.4 billion.

The projected cash outlays associated with attainment of effluent standards over the years 1968–1976 that manufacturers must anticipate is $20 billion (1971 dollars) (Table 11). While incremental annual costs will probably amount to only about two-tenths percent of aggregate values added by manufacturers, up to four percent of total capital spending of some industries will be required to comply with standards, and as much as one percent of values added in some industries (pulp and paper, steel) will be added by waste treatment costs. If such costs were absorbed, the incremental costs in 1968 would have reduced the pre-tax profits of manufacturers by nine-tenths percent. However, as seems more likely, if additional costs are passed on to consumers, with full maintenance of margins, prices of manufactured goods may increase by 0.1 percent.

Municipal—Capital Expenditures

The estimated total cost of constructing waste treatment facilities planned through Fiscal Year 1976 and needed to meet current water quality standards or enforcement requirements is $18.1 billion, (Table 12) according to a survey conducted by EPA. However, a lower estimate of $14.3 billion of required investment to achieve water quality standards by 1976 resulted from the Waste Treatment Facilities Evaluation model (Tables 13 and 14).

As well as differing from the model estimate, the 1971 survey estimate differs from the 1970 survey estimate of $12.6 billion. Among the reasons for this variance are: a different time period for each survey; a 15 percent inflation rate in the cost of construction in the period between the two surveys; a tightening of water quality standards or implementation schedules in certain situations; and more comprehensive assessing and reporting.

TABLE 11.—Projected Cash Outlays Associated With Attainment of Discharge Standards by 1976 (Median Efficiency)

		MILLIONS OF 1967 DOLLARS OUTLAYS, 1968–1976						
SIC	Industry	Net Investment	Growth	Replacement	Interest	Operations	Total	Total 1971 Dollars
20	Food & Kindred Products	722	189	302	474	413	2,100	2,850
22	Textiles	186	82	84	131	77	560	760
24	Lumber & Wood Products	99	—*	28	44	26	197	267
26	Paper & Allied Products	856	145	410	641	591	2,643	3,587
28	Chemical & Allied Products	324	573	432	671	729	2,728	3,702
29	Petroleum & Coal	475	55	282	439	265	1,516	2,057
30	Rubber & Plastics	80	38	29	45	36	228	309
31	Leather	70	18	29	45	29	191	259
32	Stone, Clay, Glass	138	27	48	75	108	396	537
33	Primary Metals	873	560	421	659	917	3,430	4,655
34	Fabricated Metal Products	93	48	36	56	70	303	411
35	Machinery	66	5	24	37	48	180	244
36	Electrical Equipment	90	34	40	62	83	309	419
37	Transportation Equipment	62	13	26	40	59	200	271
	Manufacturing Total	4,134	1,786	2,191	3,419	3,451	14,981	20,329
	(1971 Dollars)	(5,610)	(2,424)	(2,973)	(4,639)	(4,683)	(20,329)	
	Maximum Cost Total	5,430	1,845	2,520	3,939	4,637	18,609	
	(1971 Dollars)	(7,369)	(2,504)	(3,420)	(5,345)	(6,292)	(25,252)	
	Minimum Cost Total	1,416	880	1,267	1,976	1,792	7,322	
	(1971 Dollars)	(1,922)	(1,194)	(1,719)	(2,669)	(2,432)	(9,936)	

*Rate of improvement in water productivity is greater than rate of growth of output.

TABLE 12.—Survey Results of Estimated Construction Cost of Sewage Treatment Facilities Planned for the Period FY 1972–1976 (Millions of 1971 Dollars)

	FY–1972	FY–1973 [1]	FY–1974 [1]	FY–1975	FY–1976	Total
TOTALS	**5,278.2**	**6,080.0**	**3,198.2**	**2,236.5**	**1,289.3**	**18,082.2**
Alabama	33.5	9.6	9.5	7.9	5.1	65.6
Alaska	4.1	26.4	2.3	7.5	—	40.3
Arizona	10.7	8.9	—	6.2	1.4	27.2
Arkansas	12.5	27.7	11.3	10.0	—	61.5
California	280.4	930.9	218.4	369.0	340.8	2,139.5
Colorado	23.3	14.4	8.4	30.0	6.1	82.2
Connecticut	96.2	95.1	53.5	—	—	244.8
Delaware	7.8	8.8	79.0	2.5	5.6	103.7
Dist. of Columbia	62.7	40.9	—	—	—	103.6
Florida	313.0	125.7	89.4	106.3	17.0	651.4
Georgia	36.3	89.6	15.8	—	12.6	154.3
Hawaii	15.0	28.5	4.6	24.1	—	72.2
Idaho	15.7	8.6	7.4	.3	.4	32.4
Illinois	336.7	332.5	240.8	382.9	38.7	1,331.6
Indiana	161.3	207.2	121.7	22.1	27.6	539.9
Iowa	16.8	78.8	72.7	21.8	7.2	197.3
Kansas	19.8	28.8	5.9	3.2	11.6	69.3
Kentucky	46.8	35.0	14.3	39.5	27.1	162.7
Louisiana	68.5	40.6	28.2	17.7	.1	155.1
Maine	25.4	100.5	15.0	35.4	25.0	201.3
Maryland	201.5	204.0	214.6	15.7	36.6	672.4
Massachusetts	206.5	190.8	149.9	80.0	—	627.2
Michigan	331.8	523.2	307.3	100.4	130.0	1,392.7
Minnesota	142.3	112.1	41.5	30.8	12.9	339.6
Mississippi	32.5	17.4	7.4	14.5	18.2	90.0
Missouri	9.2	160.0	71.9	38.1	27.4	306.6
Montana	13.7	2.7	7.8	—	3.0	27.2
Nebraska	1.8	28.7	23.5	24.1	15.7	93.8
Nevada	.4	30.7	10.8	1.3	—	43.2
New Hampshire	21.3	36.9	62.8	58.5	10.5	190.0
New Jersey	461.9	554.4	105.6	299.6	6.3	1,427.8
New Mexico	17.8	12.8	.1	—	—	30.7
New York	1,047.1	422.4	140.8	102.0	167.2	1,879.5
North Carolina	36.6	66.5	31.3	18.2	1.1	153.7
North Dakota	1.4	3.7	1.7	—	.3	7.1
Ohio	277.2	250.3	313.3	62.7	156.8	1,060.3
Oklahoma	14.4	24.2	28.5	8.1	39.8	115.0
Oregon	41.5	72.3	9.9	13.0	12.6	149.3
Pennsylvania	187.2	343.3	259.0	105.8	1.2	896.5
Rhode Island	9.9	35.6	25.7	—	—	71.2
South Carolina	31.2	29.5	33.3	18.8	17.8	130.6
South Dakota	9.3	1.7	2.8	3.3	.9	18.0
Tennessee	120.6	31.0	17.4	11.9	7.8	188.7
Texas	127.5	165.5	110.3	34.4	11.5	449.2
Utah	14.5	3.5	2.5	1.4	5.5	27.4
Vermont	5.3	13.5	13.5	6.3	3.7	42.3
Virginia	100.0	243.3	81.1	11.0	61.5	496.9
Washington	38.1	67.8	23.8	52.6	5.8	188.1
West Virginia	38.2	32.5	2.1	23.0	—	95.8
Wisconsin	135.1	97.2	21.3	6.6	3.9	264.1
Wyoming	1.5	2.4	—	—	—	3.9
Guam	2.2	10.5	—	4.1	.7	17.5
Puerto Rico	4.2	48.6	76.0	.8	.5	130.1
Virgin Islands	8.0	2.5	2.5	3.1	3.8	19.9

[1] Separate costs for FY 1973 and FY 1974 estimated from FY 1972/1974 total.

The evaluation model results in an estimate of $14.3 billion needed to be invested during the period Fiscal Years 1972–1976 in order to overcome deficiencies in present facilities and to keep pace with growth, capital replacement and inflation. On the other hand, the survey result of $18.1 billion is an aggregation of State and local estimates of their construction activity during this same period. There are several basic methodological differences between the survey and the model:

The model uses statistically derived cost functions, whereas the survey relies on community-generated cost data.

The model uses statistically estimated growth and replacement factors and calculates the construction required to maintain the capital stock of treatment plants and to provide for additional population and industrial wastes.

The model also includes a specific factor which adjusts for price increases in construction activities. As noted in the survey discussion, State and local intentions are expressed in 1971 dollars.

A primary purpose of the survey is to give an indication of each local government's construction plans in the municipal waste treatment sector. The survey reflects the summation of local activities which, when viewed in the aggregate, presents an estimate of desired construction activity which may or may not commence during the period Fiscal Year 1972–1976, e.g. compressing of the 20 year California program into five years. The purpose of the model is slightly different in that it provides an estimate of the investment activity between 1972 and 1976 that local governments will be required to undertake in order to maintain their current growth and replacement needs and make progress toward constructing those facilities required to meet water quality standards.

TABLE 13.—Five-Year "Backlog" Capital Elimination Schedule (Millions of 1971 Dollars)

Year	"Backlog" at Year End	Growth	Recapitalization	Investment [1]
1971	5081.0			
1972	3871.2	691.7	588.4	2870.9
1973	2740.9	768.1	682.2	2870.9
1974	1706.1	853.0	777.6	2870.9
1975	784.9	947.2	874.6	2870.9
1976	0.0	1051.9	972.9	2870.9
Total Investment, 1972–1976				14,354.5
"Backlog"				6,147.0
Growth				4,311.8
Recapitalization				3,895.7

[1] Includes 7.5 percent cost increase factor for the period.

Evaluation of Benefits and Costs

Aside from the specific municipal and industrial sectors, attention to the marginal benefits and costs of various treatment levels from a national point of view is necessary to insure that the water pollution goals sought are defensible in terms of their net benefit to society.

TABLE 14.—Model Investment Schedule Investment Needed to Reduce Backlog by 1976 (Millions of 1971 Dollars)

TOTALS	14,354.5				
Alabama	201.0	Louisiana	129.2	Oklahoma	186.6
Alaska	28.7	Maine	43.1	Oregon	186.6
Arizona	86.1	Maryland	272.7	Pennsylvania	631.6
Arkansas	100.5	Massachusetts	143.5	Rhode Island	43.1
California	1,550.3	Michigan	760.8	South Carolina	143.5
Colorado	258.4	Minnesota	373.2	South Dakota	28.7
Connecticut	71.8	Mississippi	114.8	Tennessee	244.0
Delaware	14.4	Missouri	258.4	Texas	1,205.8
Dist. of Columbia	215.3	Montana	57.4	Utah	129.2
Florida	502.4	Nebraska	100.5	Vermont	28.7
Georgia	387.6	Nevada	43.1	Virginia	330.1
Hawaii	43.1	New Hampshire	28.7	Washington	315.8
Idaho	86.1	New Jersey	229.7	West Virginia	114.8
Illinois	488.1	New Mexico	86.1	Wisconsin	502.4
Indiana	617.2	New York	1,004.8	Wyoming	28.7
Iowa	172.3	North Carolina	258.4	Guam	
Kansas	215.3	North Dakota	57.4	Puerto Rico	201.0
Kentucky	143.5	Ohio	890.0	Virgin Islands	

An analysis of the marginal costs and benefits to levels of treatment suggests:

Because costs accelerate rapidly as higher levels of treatment are achieved (Table 15 and Table 16) the total cost of meeting very high levels of treatment approaching zero discharge could be many times those required to meet current water quality standards.

The improvement in beneficial uses of water from a no discharge policy is likely to be modest compared to the costs. The ultimate goal of any pollution control program is to achieve certain environmental quality objectives. These goals have traditionally been set forth in standards of quality that deal with preventing adverse effects or achieving certain beneficial uses. For example, higher water quality provides such beneficial uses as water supply, recreation and fish and wildlife. The least costly method of meeting these objectives is to tailor effluent reductions to meet those ambient objectives. To the extent that the effluent reductions are more stringent than those which are required, excessive costs are incurred needlessly. This is particularly true at high control levels where control costs escalate very rapidly. A study of cost and benefits in the Delaware Estuary performed by the Federal Water Pollution Control Administration illustrates the relationship of benefits to costs in the following table:

Dissolved Oxygen (mg/1)	Index of Costs of Control	Index of Recreational Benefits
6.5	575	128
5.5	320	115
5.0	150	105
4.0	100	100

The Delaware study is now nearly a decade old. EPA recognizes the paucity of information concerning economic measures of benefits and is making a concerted effort to refine costs and develop methodologies for quantifying benefits.

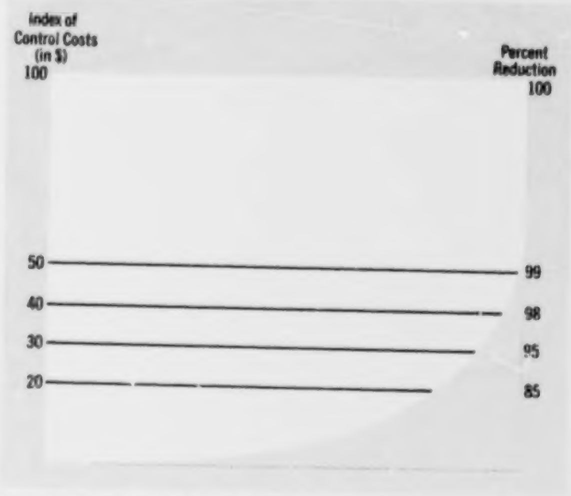
A number of adverse environmental impacts would occur such as higher energy consumption and solid waste problems. Disposal on land will increase dramatically, resulting in potential soil and water contamination. High effluent limitations would also encourage deep-well disposal with great potential for long-term damage to underground water supplies.

Large resources devoted to achieving small increases in water quality benefits have the effect of withdrawing resources from other environmental efforts or other national priorities.

TABLE 15.—Index of Pollution Control Investment Costs Related to Level of Abatement

Level of Removal (Percent)	Increased Percent of Removal	Cost Index	Cost Per Increased Percent of Removal
100	1	500	250
99	1	250	50
98	3	200	17
95	10	150	5
85	—	100	—

TABLE 16.—Total Control Costs as a Function of Effluent Control Levels



Source: **Interior 1965 Saline Water Conversion Study**
Young and Pisano: "Nonlinear Programming Applied to Regional Water Resource Planning".

FWPCA: **Cost of Clean Water**, 1968, Volume I.

FWQA: **Cost of Clean Water**, 1970, Volume IV.

Although considerable insight into and understanding of the economics of water pollution control have been gained through past studies, there are still many unanswered questions concerning the costs of pollution abatement and the impact that efforts to cleanse our environment will have on the national economy. The challenge, however, is clear: if the Nation's water resources are to be enjoyed without the burden of increasing water pollution, now is the time to institute prudent action to clean up our streams. The people and their government have accepted the challenge. EPA reflects their determination and will give continuing emphasis to devising policies and programs which will create a cleaner environment in the most expeditious and economical manner.

CATEGORICAL PROGRAM

SOLID WASTE MANAGEMENT

NATURE OF THE SOLID WASTE PROBLEM

Solid waste problems vary widely across the United States, but are generally characterized by unnecessarily high collection costs and disposal practices that are environmentally and aesthetically unacceptable. These problems are most intense in the urban complex and are generated not by lack of adequate technology and financial capacity, but primarily by lack of incentives at the local level to operate sound solid waste management systems; institutional and political constraints for maximizing system productivity and utilization of environmental safeguards; public attitudes; and obsolete financing and institutional practices.

Some cities have critical problems typified by an inability to locate disposal sites, an inability to efficiently operate or control the collection and disposal system, or an inability to raise revenues to cover increasing costs for collection and disposal service. Other cities have very few major problems, typified by long range acquisition of disposal sites, efficiently controlled regional collection and disposal systems, and an ability to obtain needed operating and capital funds.

Approximately $5.5 billion is spent annually on solid waste management. Even though costs in some areas may increase as dumps are converted to sanitary landfills and incinerators are upgraded to meet environmental standards, extrapolations of costs from exemplary systems indicate that, if properly managed, the total national costs for proper solid waste management need not rise much above the present level.

There are many barriers to affecting change at the local level. Political realities exist which make it difficult for neighboring communities to join together in obtaining economies of scale in waste collection and disposal. For many areas, solid waste management has historically been funded by revenues generated by property taxes. As these funding mechanisms reach their revenue generating limit and waste management costs rise, collection and disposal service deteriorates.

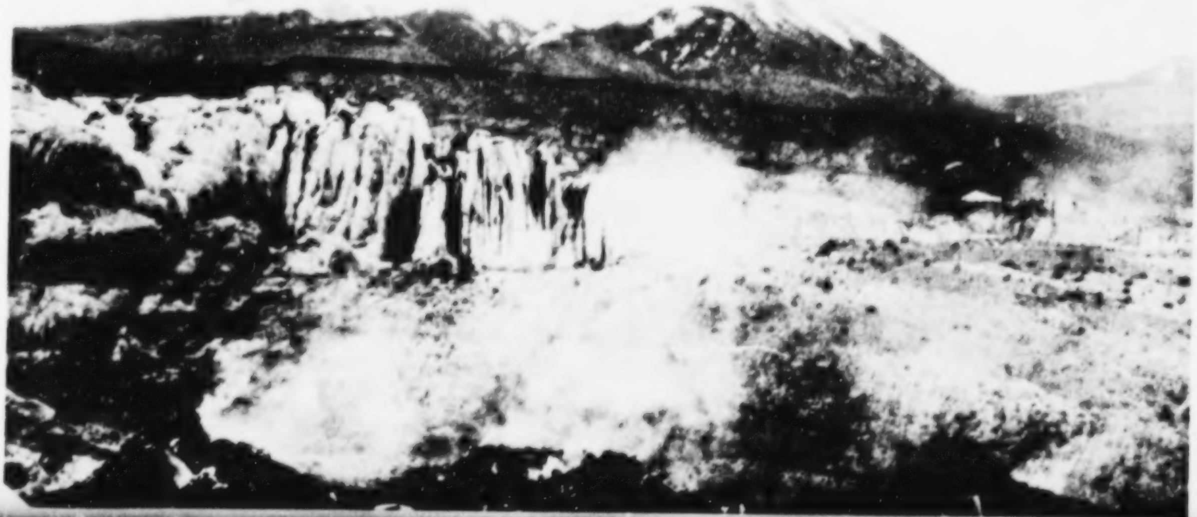
Lack of attention to solid waste management by local government means that many systems are not managed efficiently. There is a lack of effective ordinances for collection and disposal at the local level. Many communities lack the proper management tools and mechanism to operate an efficient, low cost system.

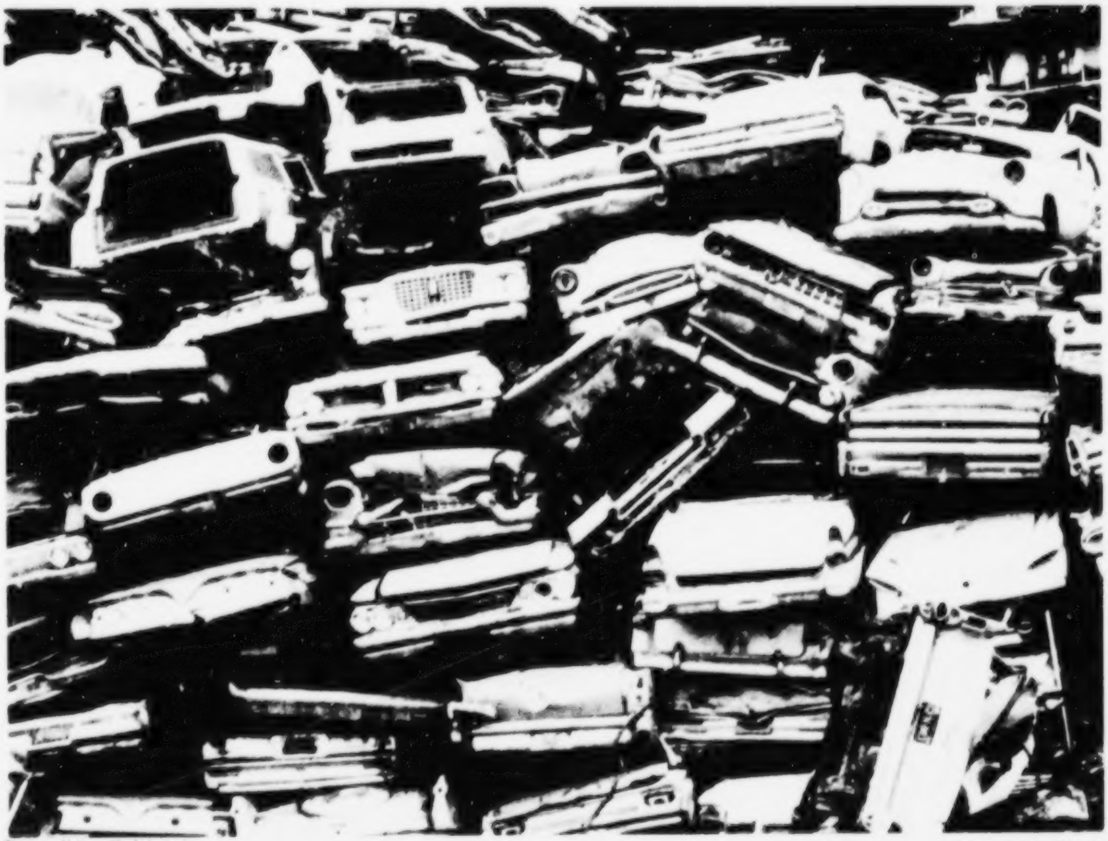
The general public is apathetic to solid waste management problems. Generally, the public is willing to pay the full cost for solid waste services and environmental control measures, but few systems take advantage of this fact and utilize revenue raising mechanisms which are, in some cases, constrained. In some parts of the country, there is also a great public concern about proximity to disposal sites like sanitary landfills, which aggravates the problem of finding acceptable disposal sites in densely populated areas.

Resource recovery offers significant potential as an alternative to the disposal of solid waste, but will not materialize as a real alternative for most urban areas in the near term. The principal problem in this area is not with the technology of resource recovery, but lack of adequate market demand for materials and fuel recovered from the solid waste stream.

Moab dump, considered a recreational asset.

Documerica Photo





Escondido, California

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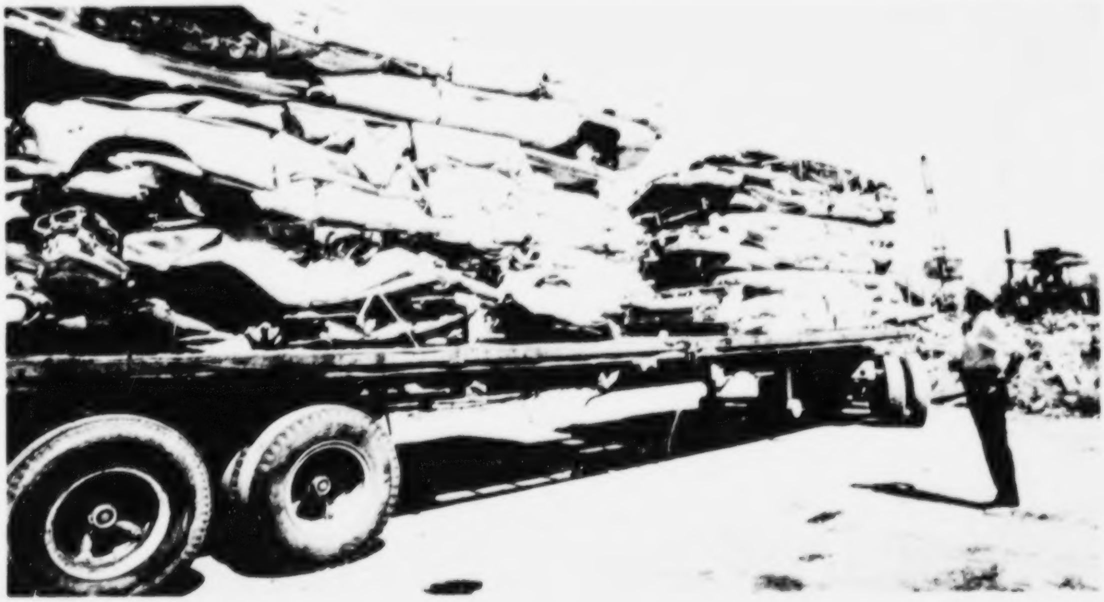

Documerica Photo

Klean Steel Manufacturing Corp., Flowood, Mississippi, has a 2,000 horsepower mill which shreds 300 cars a day. Steel rods made from shredded autos are being used as reinforcement in portions of Interstate 55.

Documerica Photo

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OBJECTIVES OF THE SOLID WASTE PROGRAM

In light of the above assessment of solid waste problems, EPA's solid waste program has concentrated the majority of its resources in pursuit of the following objectives:

1. To demonstrate that existing solid waste problems can be solved by:
    a. upgrading local methods for managing solid waste collection to the best demonstrated practice;
    b. replacing poor incinerators and open dumps with economical, environmentally sound disposal practices now available;
    c. recovering resources from waste where market conditions permit;
    d. creating institutional change to maximize and sustain productivity and utilization of environmental safeguards.
2. To perfect sanitary landfilling as a disposal technique by solving remaining problems associated with leachate, gas and settlement.
3. To develop techniques and institutions to handle the collection, transport and disposal of hazardous wastes.
4. To encourage greater resource recovery through such means as Federal purchasing power or market incentives for resources recovery.

At the same time, EPA's longer-term objective is increased resource conservation. This is broadly defined to include all substances, energies, manpower, and conditions which are valued. Maximum resource conservation may be accomplished for different locales by disposing of wastes in a sanitary landfill, with a park or a golf course as the eventual end use, or by recycling waste materials by converting them to other uses such as energy production.

PROGRAM OPERATION

The chief program tools that OSWMP utilizes to achieve its objectives are:

1. Planning grants awarded to State and local agencies to develop plans which will upgrade the environmental aspects of solid waste management and rationalize delivery systems.

EPA currently has solid waste planning grants with 49 States and 20 local and regional agencies.

Planning grants concentrate on obtaining survey data to plan waste facilities, studying alternative collection and disposal or recycling systems, determining appropriate local ordinances or State legislation and examining alternative financing and management systems. Since solid waste planning grants were initiated, the number of State solid waste programs has increased from five to 50.

The number of full-time State solid waste personnel has increased from 13 to over 200.

As States complete their plans, emphasis will shift from issuance of State grants to the issuance of local/regional grants focusing on environmental, self-financing and regulatory aspects.

Grant award criteria, promulgated in regulations, have been structured toward "real world," "implementable" plans and away from surveys and models that end up on shelves. Regional office grant monitoring and review procedures will concentrate on aspects leading toward implementation of the rational delivery system and environmental solution.

2. Technical assistance will be provided to local and regional solid waste agencies to improve the environmental aspects of their systems while lowering overall systems costs.

Major technical assistance will be targeted to cities or areas which have a capacity (resources and willingness to utilize resources) to improve their solid waste management.

In July 1970, a program called Mission 5000, was launched. The objective is to close 5000 of the 15,000 open dumps across the Nation in two years through local action. In 14 months, the program succeeded in closing, or converting to sanitary landfill, 800 of these sites.

Mission 5000 efforts will be focused on the public education to make citizens and local decision-makers aware of solid waste problems, potential solutions, and local progress in implementing such solutions.

3. Demonstration grants will be utilized to demonstrate that existing solid waste management problems can be solved by local communities through the rational application of existing knowledge and technology.

Prior to incorporation into EPA, the solid waste program had placed primary emphasis on technology development. This effort, which included research and development, pilot plant operation and demonstration, received over two-thirds of the total funds and one half of the man years expended by the program since its inception in 1965.

Most of EPA's 60-odd "demonstration grants" awarded to municipalities since 1965 have been heavily equipment-oriented.

After moving to EPA, internal studies indicated that the time had come to shift the solid waste program priorities away from technology development to an effort designed to upgrade current practices to acceptable levels (managerically and environmentally) that utilize existing knowledge and technology. This is not to say that technology should play no role in EPA's solid waste program, but rather that it should not dominate EPA's concern as it has in the past. Technology should be pursued by EPA only under strict conditions, and focus primarily on practical modifications of existing technology.

Priority will be given to those projects which create the institutional change required to improve labor productivity, provide sound financial support for waste management, and replace poor incinerators and open dumps with economical, environmentally sound disposal practices.

The availability of grants and the award criteria have been publicized and grants are being actively "solicited."

4. Resources recovery demonstration grants will be awarded to demonstrate resource recovery where adequate local markets exist.

Criteria for these grants, setting stringent technical and economic requirements for EPA financial participation, were announced in the *Commerce Business Daily* on March 24, 1972.

Market conditions will be investigated prior to, or in conjunction with, applicant selection for Section 208 funding. Systems must be commercially viable: i.e., should have a net cost competitive with alternative disposal techniques on a given area. Systems must be technically sound; the system must be past the pilot plant stage.

In addition, EPA is studying another increasingly critical aspect of the solid waste problem: the disposal of hazardous wastes. Biological, radiation, pesticide, and toxic mercury wastes are examples of materials which present serious disposal problems.

As part of a study to determine the advisability and feasibility of establishing a system of national disposal sites, EPA currently is assessing the amount, locations and present means of disposal of hazardous materials, and is recommending desired disposal methods, warning potential sites, and estimating the costs of operating such a system.

In addition, President Nixon, in his 1972 Environmental Message proposed Federal regulation of land and underground disposal of all toxic substances.

ACCOMPLISHMENTS

Several technical assistants and resource recovery demonstrations highlight the accomplishments of EPA's solid waste management program.

Technical Assistance

1. Cleveland, Ohio, is an example of a city which was forced by financial constraints to examine the efficiency of its solid waste management system. With Federal assistance, Cleveland implemented changes in solid waste collection that resulted in $4 million savings in one year (potentially another $5 million in 1972) and then upgraded its disposal techniques. This amounted to a 30 percent reduction in total waste management costs.

2. River Rouge, Michigan, utilizing technical assistance from EPA, rerouted collection vehicles and altered crew sites. Total system costs were cut in half.

3. Utilizing technical assistance, southeast Oakland County, Michigan, rerouted collection vehicles and saved approximately 15 percent of total waste management costs. One community, Huntington Woods, also altered equipment and crew sizes and cut collection costs in half.

4. Chilton County, Alabama, implemented a rural collection system and areawide sanitary landfill under an EPA demonstration grant. This successful concept has been adopted by a number of other rural counties without Federal financial assistance.

Resource Recovery

1. Franklin, Ohio project, is a 150-ton per day plant (24 hour basis), funded under an EPA demonstration grant, which mechanically separates glass, aluminum, paper fiber and ferrous metal. The process is based upon a hydra-pulper which shreds and slurries incoming municipal refuse. Firm market agreements were negotiated with local industries for the recovered materials.

2. In St. Louis, Missouri, shredded municipal refuse (input of 300 tons per day in one eight hour shift) is being used as a supplementary fuel in a coal electric utility boiler in this EPA demonstration project. This system has great potential given its broad market applicability, low capital investment requirements, increasing demands for fuel, etc.

3. Local private industry in Jackson, Mississippi is successfully operating an automobile shredder, attracting abandoned hulks from a three State area. Shredded scrap is sold to private industry for making steel for use as roadside barriers along interstate highways.

PESTICIDES

There are presently some 34,500 registered products manufactured from one or more of 900 chemical compounds to be used against harmful weeds, insects, plant diseases and other pests attacking wildlife, livestock and food crops. Although farmers are the largest users of pesticides, about half of the registered products are for non-farm uses in and around homes, industrial plants, commercial buildings and other institutions.

In 1970, U.S. production of these products amounted to 1,034 million pounds, including 59 million pounds of DDT products (the lowest since 1949), one million pounds of mercury fungicides, 89 million pounds of the aldrintoxaphene group, 15 million pounds of parathion, and 12 million pounds of 2,4,5–T. As in the other programs, EPA's attack on the problem has been multi-pronged. One approach has been simply to cancel the registration of certain products that EPA's scientists determined were too dangerous for their intended uses. In 1971, such cancellations involved some 1,800 to 2,000 DDT products of about 250 companies, 1,300 aldrin/dieldrin products of 377 companies and 307 2,4,5–T products of 107 companies.

Another EPA pesticide control mechanism is the statutory authority to establish safe limits on pesticide residues in food. By forcing food producers to comply with these limits, EPA is launching a direct attack on the unnecessary and careless use of these chemicals.

Many of the pesticide accidents which occur are, in fact, due to misuse. A major proportion of pesticide chemicals are applied by commercial applicators for agricultural purposes and for structural control of pests. Federal Pesticides activities were in somewhat unique situation at the time Reorganization Plan No. 3 was promulgated, establishing EPA. It was not a complete ongoing program like Water Quality, Air Pollution and Solid Wastes. Program activities were divided among three major Federal agencies:

> Research on the effects of pesticides in fish and wildlife was conducted by the Department of Interior. Under the provision of the Reorganization Plan 3, the Gulf Breeze Biological Laboratory of the Bureau of Commercial Fisheries was transferred from Interior to EPA.
>
> Establishing standards limiting pesticide residues in food and for conducting related research, was the responsibility of the Food and Drug Administration, Department of Health, Education and Welfare. When EPA was created the Perrine Primate Laboratory in Florida, Community Studies Office in Chamblee, Georgia, and the unit responsible for pesticide residue tolerances, petition review and control were shifted from FDA to the new Agency. However, as part of its food protection activities, FDA retained responsibilities for monitoring residues in foods, and for regulatory activities to remove food from the market if it is found to contain excess residues.
>
> Pesticide registration and enforcement activities provided for under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) and related research and soil monitoring activities were formerly conducted by the Department of Agriculture. These functions were also transferred to EPA. The Department of Agriculture retained pesticide research activities on livestock, poultry and plant effects, several other pest control programs and the education program on pesticide conducted by the Department's Agricultural Extension Service.

There are two administrative procedures under the present FIFRA which can be invoked to limit the use of pesticides detrimental to man and the environment. The milder one, "cancellation", allows the continued shipment of the pesticide products in interstate commerce while a decision to prohibit future use is reviewed; the stronger administrative procedure, "suspension", prohibits the further sale in interstate commerce of the product with possible recall action until administrative appeals and reviews are finished and a final decision made.

Notice of cancellation was issued in August 1970, on products containing DDT for certain specific uses. In January of 1971, a notice was issued which cancelled registrations of all products containing DDT because of serious question effects of its use. In March of 1971, EPA began prehearing conferences concerning the 42 product formulators involved in accordance with the administrative approval provisions contained in the enabling legislation.

The registration of the product Mirex produced by the Allied Chemical Company was cancelled March 1971. In this case the manufacturer requested an advisory committee as provided under Section 4c of FIFRA, and the National Academy of Sciences was asked to list experts to serve on the committee. Due to the complex procedures which must take place, final action on the cancellation of this product could conceivably take one to two years.

Notice of cancellation was issued March 1971, cancelling the registrations of all products containing aldrin and dieldrin because of similar serious questions about product safety. About 80 companies have invoked the administrative appeal procedure described above requiring an advisory committee and some companies have also requested public hearings. These procedings could also be lengthy.

Notices of suspension were issued as of April 1970, concerning some uses of 2,4,5-T. Again, the administrative appeal procedure was invoked by the companies for referral to an advisory committee which issued its report in May 1971. A public hearing was called for in the fall of 1971 to obtain additional facts on 2,4,5-T while a suspension order continues to prohibit the use of this herbicide on food crops for human consumption.

The DDT cancellation involved approximately 250 companies and 1,800 to 2,000 products, and the aldrin/dieldrin cancellation involved 377 companies and about 1,300 separate products. The 2,4,5-T suspensions resulted in recall actions for over 307 products and 107 companies. Under present law, companies that appeal cancellation of Federal registrations may continue to market their products in interstate commerce pending final resolution of administrative appeals. After seven months of public hearing testimony and additional hearings by the parties concerned, it was decided that most uses of DDT would be banned after December 31, 1972. EPA's action does not bar the use of DDT in the cases of emergency public health measures, such as might follow an outbreak of malaria or other insect-borne epidemic. Another exception to the ban is for three minor crops: green peppers, onions, and sweet potatoes in storage, for which no effective alternative has been developed.

The overall activities of EPA's pesticides program are contained in six functional areas: Product Registration and Tolerance, Setting Standards and Criteria, Technical Assistance, Environmental Surveillance and Research, and Market Surveillance and Enforcement.

REGISTRATIONS AND TOLERANCES

New product applications, as well as amendments to and registration renewals, have been received at an average rate of 450–600 a week. This includes renewals for projects registered five years ago of which there is a total potential of about 10,000 in Fiscal Year 1972. Registration applications and amendments in the review process increased to a peak of 5,422 in Fiscal 1972, but have since been reduced to 1,424 in April 1972. The objective of the review procedures is to protect the public health and the environment, while at the same time providing efficient review from the manufacturers' viewpoint. Handling and review time of applications is being reduced to a median range of 45 to 60 days through more efficient procedures, without sacrifice in the quality of the review.

The Food, Drug and Cosmetic Act requires the establishment of tolerances for pesticidal chemicals on or in food and animal feeds. No such pesticide product can be registered until appropriate tolerances have been established.

There were 212 petitions in the review process at the start of February 1971. Due to changes in the administrative definition of residue tolerances, only a small change in the over 90-day backlog level had been noted until recently. Recently added toxicologists have begun to reverse the trend of the over 90-day backlog from 64 in December 1971, to 36 in March 1972. The objective is to protect the public health and the environment by not allowing chemical concentrations of residues higher than safe levels. Once the petition backlog is reduced, it is expected that selective reexamination of previously

Documerica Photo

Dusting sulphur to retard mildew on grapevines: Fresno, California.

established tolerances can be begun, as well as processing all new petitions within the 90-day statutory time frame.

A special in-house scientific review group has been established to review present registrations of products containing mercury, arsenic and lead, heptachlor and chlordane, endrin, benzene hexachloride, lindane, toxaphene, strobane, captan, folpet, difolatan, carbary and 2,4–D and any others whose use may raise substantial questions as to safety. Recommendations on mercury, arsenic and lead have already been completed; chlordane and heptachlor are expected to be completed by mid-1972. The 10 other listed products are expected to be reviewed during Fiscal Year 1973.

ENVIRONMENTAL SURVEILLANCE

The activities of environmental surveillance include community health studies, soil residue and estuarine monitoring and some limited amount of air monitoring. It is expected that ultimately these data will provide for more adequate use controls, reevaluation of certain pesticide tolerance levels, as well as improved procedures for diagnosis and treatment of pesticide poisoning in man. As these monitoring studies are designed to provide more closely interrelated end-data, they will provide an alert system for delayed effects of pesticide chemicals on man, a warning system for registration re-examinations, setting residue tolerances for market surveillance and improving the amount and kinds of technical assistance to States.

Epidemiological studies of human case subjects in areas of heavy pesticide usage is the only program of its kind in the U.S. There are currently 14 ongoing State studies in Arizona, California, Colorado, Florida, Hawaii, Idaho, Iowa, Michigan, Mississippi, New Jersey, South Carolina, Texas, Utah and Washington. These studies are contracted through State health agencies and with local universities. These are long-term studies to detect any delayed or obscure health effects that may result from long periods of low level exposure to any of a variety of pesticide chemicals. Ambient air at selected sites in 30 States is being monitored for pesticide residues, and these data will be correlated with human health status.

Profile studies of pesticide residues are being monitored in soils in 36 states and five urban areas in Fiscal Year 1972. Soils are the most important storage area of the environment for pesticides, as well as other contaminants. Recognizing a need for more intensive examination of specific problem areas, sampling has been carried on in the corn and cotton belt regions; also special studies have been conducted on cattle feed lots, commercial catfish farms, peanut growing land, and vegetable and orchard areas.

Mercury and arsenic have been found to be widespread in soils in a number of States, and DDT seems to be as wide-spread in non-crop areas as in crop areas. In addition to the expanded monitoring program, studies are being made to determine the distribution of mercury, cadmium and other heavy metals of the soil component of the environment; and the fate and persistence of the herbicides 2,4–D, 2,4,5–T, picloram and their contaminants.

TABLE 17.—CROPLAND RESIDUE STUDIES

TABLE A.—Five States in U.S. With Highest DDT Residues

State	Average Residue (ppm)	Percent	Range	No. of Samples
Alabama	1.13	90.9	0.05–8.08	22
California	1.46	83.0	0.01–41.81	59
Georgia	1.24	100.0	0.01–6.31	14
Michigan	2.67	25.6	0.01–78.36	39
Mississippi	2.07	89.3	0.03–13.14	28

By 1978 nationwide soil residue monitoring is projected to include:

Cropland—about 2500 stations a year in 48 states

Non-cropland—about 1000 stations a year in 48 states (forest, range and pasture)

Urban areas—about 20 cities of 50 states a year

Estuarine Monitoring was started in 1965 by the Bureau of Commercial Fisheries and until the present time the program has been designed toward discreet problems of commercial estuarine fisheries. Oysters and clams have been primarily sampled in the past because of their commercial value and also because as sessile forms they are particularly well suited for pesticide monitoring. Samples are being taken monthly at 170 coastal locations and are normally collected under contract with States. The present program has been redesigned to cover 200 primary estuaries and subsequently expand to 600 secondary estuarine areas that show significant levels of pollution.

MARKET SURVEILLANCE

Market Surveillance includes the activities of sampling pesticides and devices at manufacturer, wholesale, distribution and retail outlets, by field inspectors and their subsequent examination in field chemistry laboratories and the centralized headquarter biological laboratories. Post-market surveillance is undertaken for a two-fold purpose: for labeling violations for enforcement purposes and for the investigation of use records, historical information on accidents and epidemiological safety information accumulated since original marketing

TABLE B.—Nine States in U.S. With Highest Dieldrin Residues

State	Average Residue (ppm)	Percent	Range	No. of Samples
Florida	0.6	35.3	0.01–0.52	17
Illinois	0.11	61.9	0.01–1.42	139
Iowa	0.06	53.3	0.01–0.42	150
Kentucky	0.06	54.8	0.01–0.65	31
Michigan	0.07	25.6	0.01–1.01	39
North Carolina	0.09	25.0	0.02–1.53	28
South Carolina	0.06	27.3	0.02–0.56	11
Va. West Va.	0.07	25.9	0.01–1.60	27

as a basis for reexamination of previously submitted registration data. A natural selective sampling schedule is expected to provide for the collection of about 6,000 product samples in 1972.

MONITORING OF ACCIDENTS

Present reporting of pesticide accidents are directed primarily to human accidents and cover less than one percent of what has been generally estimated to be 50,000 accidents and incidents occurring each year. A major constraint has been the overall inadequacy of current reporting of human and other accidents and incidents. Also in recent years the millions of pesticide containers and packages of all sizes have become disposal problems for farmers, commercial applicators, industry and local and State agencies. Prior to the EPA reorganization, field investigation of pesticide accidents and incidents involving humans were very limited. Fewer than 200 human accidents were investigated in Fiscal Year 1971, and less in previous years, along with limited numbers by other Federal and State agencies. Since one of the outstanding basic deficiencies in this area is the reporting system, present efforts are being directed toward working with States and other Federal agencies. A comprehensive national pesticide accident investigation and reporting system is being developed. Also, EPA is strengthening its Regional Office capabilities to work with State agencies in developing uniform and productive programs.

A scientist in an EPA laboratory conducting research to identify pesticide residues.

TABLE C.—Comparison of DDT Residues Between Cities and Cropland

City and State	City	Cropland
Bakersfield, California	0.36	1.46
Camden, New Jersey	1.36	0.14*
Houston, Texas	0.35	No sample
Manhattan, Kansas	0.78	No sample
Miami, Florida	5.93	0.89
Milwaukee, Wisconsin	1.07	0.02
Salt Lake City, Utah	0.49	0.22*
Waterbury, Connecticut	0.98	0.59*

* Average from composite of States.

The Food and Drug Administration operates two mechanisms that provide data on pesticide accidents. A Clearinghouse on Poison Control collects data from 580 local non-Federal supported poison control centers. The FDA collects information on about 130,000 poisoning cases annually from these centers, and of these, 5,000 to 6,000 relate to poisonings with pesticides.

RESEARCH

New scientific research on the effects of selected products is underway to provide a basis for registering or cancelling registration of these products. Continuing research on effects of pesticides and other metabolites on human health, animals and aquatic life is being conducted. Controlled animal exposure studies using primates and rats as test-animals are part of EPA's efforts to learn more about the basic hazards of pesticide chemicals. Bioassays with aquatic animals and organisms have been undertaken to determine acute and chronic effects of pesticides on aquatic life.

Research for regulation purposes represents only part of the total research effort. Simultaneously, research is being conducted to develop alternatives to pesticides, such as so-called biological controls which do not pollute the land and water, or new pesticides which quickly break down into harmless substances after performing their function. This research effort involves EPA, NSF, and the Department of Agriculture with much of the work being done by the academic community.

In the years to come, EPA will seek the strengthening of regulatory controls on the uses and users of pesticides, rather than just on the distribution of pesticides. Proposed legislation calls for Federal control over the use of pesticides in all applications, and the licensing and training of commercial pesticide applicators for hazardous, restricted use pesticide applications. On the public front, EPA and other agencies are conducting a major information program to encourage the public to use pesticides more carefully.

RADIATION

EPA has the basic responsibility to protect the public from the adverse effects of ionizing and non-ionizing radiation. This authority comes from Executive Reorganization Plan No. 3 of 1970, transferring to EPA specified functions and resources from the Atomic Energy Commission, the Bureau of Radiological Health, and the Federal Radiation Council. These transferred functions provide EPA with the authority to:

1. Establish generally applicable environmental radiation standards for the protection of the general public from radioactive materials.

2. Perform research, development, surveillance and inspection, provide assistance to States and provide training and research grants.

3. Advise the President with respect to radiation matters directly or indirectly affecting health, including guidance for all Federal agencies in the formulation of radiation standards and in the establishment and execution of programs in cooperation with the States.

In addition, Section 309 of the Clean Air Act requires EPA to evaluate the environmental impact of Federal activities as described in the Act.

EPA's responsibilities in radiation are carried out through programs of criteria development, technology assessment, surveillance and inspection and training and assistance. The major programs are as follows:

1. Development of radiation protection criteria, standards and policies.

2. Evaluation and assessment of the impact of new and developing radiation technology on man and the environment.

3. Research on environmental effects of radiation exposure.

4. Development of methodology for measuring and controlling radiation exposure.

5. Maintenance of a national surveillance and inspection program for measuring radiation levels in the environment.

6. Technical assistance to other agencies and State radiation protection programs.

7. Training of personnel for radiation protection programs.

CRITERIA DEVELOPMENT

Although significant research programs have been conducted for many years, the effects of very low levels of radiation over long periods, such as encountered from routine emissions of nuclear power plants, remain virtually unknown. Recognizing this, EPA has adopted what it considers to be a prudent, conservative policy, and bases development of radiation standards and guidelines on the following criteria.

1. All radiation is potentially harmful.

2. The biological risk associated with low levels of exposure is proportional to these risks that have been estimated at higher exposure levels.

3. Exposure to radiation should always be as low as practicable.

4. No exposure should be allowed without the expectation of some net benefit to society.

This last criteria indicates that standards for each source class of radiation, e.g., nuclear power plants, fuel reprocessing plants, mining, etc., should be treated on an individual basis.

In fulfillment of its responsibility for setting generally applicable radiation standards, the Environmental Protection Agency now has underway a major review of all existing Federal radiation protection criteria, standards, guidelines, and policies. This review is conducted in cooperation with the Department of Health, Education, and Welfare; the Department of Defense; and the Atomic Energy Commission and is scheduled for completion in 1972.

As part of this review, EPA has awarded and is monitoring contracts with the National Academy of Sciences (NAS) and the National Council for Radiation Protection and Measurements (NCRP). The NAS contract calls for review of the scientific bases for the evaluation of risks at low levels of exposure. The NCRP contract involves development of dosimetric models for selected radionuclides and realistic units for measuring hazardous non-ionizing radiations.

A further accomplishment in this area has been the completion of a draft technical report, "Estimates of Ionizing Radiation Doses in the United States, 1960–2000" in June 1971. The study will be used in EPA's overall review of the scientific basis for radiation protection guidance.

During 1971, final "Radiation Protection Standards in Uranium Mines" were published in the *Federal Register* (FR. July 9, 1971). These standards placed tighter restrictions on the amount of radioactive materials allowed in the air of uranium mines, effective July 1, 1971.

Further accomplishment in this area has been the preparation of testimony for the Joint Committee on Atomic Energy Hearings relative to the uranium mill tailings problem in the western United States.

During 1971, the Environmental Protection Agency prepared testimony for presentation before the Subcommittee on Legislation, Joint Committee on Atomic Energy, June 23, 1971, on EPA's responsibilities regarding radiation protection standards, and the thermal effects of effluents from nuclear power reactors. It has also prepared testimony for the hearings on 10 CFR Part 50 related to proposed AEC guides for light-water-cooled nuclear power reactors.

TECHNOLOGY ASSESSMENT

In this critical area, EPA has the responsibility for evaluating major Federal actions involving ionizing and non-ionizing radiation, and the design, construction, operation, modification, or discontinuance of applications of technology related to these radiations in order to assess the impact on the environment and population. All new Federally sponsored or regulated activities or extensions thereof are evaluated, as well as all industrial and commercial products or processes, which may have an effect on the environment and result in additional radiation exposure.

EPA also has the responsibility to determine the potential impact of nuclear applications or other uses of radiation, and the appropriate measures to control and minimize all potential adverse effects. Environmental impact statements submitted by other Federal agencies on applications of radiation-related technology are evaluated. Program guidance and technical assistance are provided to States, relative to applications of nuclear technology and other radiation uses in order to

Control room of San Onofre Nuclear Generating Station.

San Clemente, California: The San Onofre Nuclear Generating Station Unit 1, placed in operation in 1967.

minimize the impact of such actions on the environment and the public.

One of the major roles of EPA is assessing the environmental impact of the nuclear power program. On the one hand, there is the critical need for electricity; on the other hand, generation of electricity involves environmental impact.

President Nixon, in his message on Clean Energy to the Congress on June 4, 1971, pointed out that the Nation's demand for electricity is fast outstripping its generating capacity. "A sufficient supply of clean energy is essential," he said, "if we are to sustain healthy economic growth and improve the quality of our national life."

To meet this expanding need for electricity, the utilities have been turning principally to nuclear power stations. As of today, there are about 20 nuclear reactors in operation around the country. By 1975, there may be as many as 100. By 1990, the number may be as high as 300 more. Best estimates indicate that by 1990 over one-third of the total U.S. energy requirements will be met by nuclear power.

The environmental impact of these nuclear reactors is a major concern of EPA. As an "advocate of the environment" EPA has a direct responsibility to protect the health of people living near these plants—and near the facilities that process their fuel and receive their radioactive wastes—against the adverse effects of the plants' radioactive emissions and discharges of waste heat.

The impact of the nuclear power program is determined by review of the impact of individual plants and by studies of various classes of nuclear facilities, such as light-water-reactor power plants, reprocessing plants, mining, etc., on the basis of both immediate and long-term environmental impact. Anticipated future developments such as the breeder reactor program are being evaluated in terms of environmental impact.

Individual actions affecting the environment are reviewed through the mechanism of the environmental impact statement review process. A total of 49 environmental impact statements reviews were completed during 1971. Of these reviews, 15 related to nuclear power plants, 20 to NASA projects and the remainder to a wide variety of nuclear activities. Four additional reviews are in progress.

Criteria and guidelines have been established to enable EPA to classify its comments into four categories: EPA is in general agreement with the proposed action or has no objection to it; inadequate information is contained in the draft statement; major changes should be made in the proposed action; and the proposed action is unsatisfactory.

Studies of classes of nuclear activities and studies of the anticipated impact of future developments have been continued. Significant progress was made in this activity during the year. Several internal studies were completed on: plutonium and actinide production and release and environmental movement; fast breeder reactor operating experience; transportation problems associated with high radiation activity wastes; impact of non-power applications for nuclear energy; and models for estimating the dose contribution from several nuclear facilities in the same geographic area.

Work was completed or continued in depth in several critical special field study areas. A final report was completed on the Yankee Pressurized Water Reactor in Rowe, Massachusetts. Analysis of samples from the Connecticut Yankee Reactor (Haddam Neck) field study is about 90 percent complete. Arrangements were completed for a study at the Oyster Creek Nuclear Power Plant in New Jersey. All of these studies provide information on radionuclide concentrations in reactor effluents and determination of critical exposure pathways. These data are used to enable accurate assessment for impact review activities, and for design of environmental surveillance programs.

Satisfactory progress was made on the long range study at the H. B. Robinson Nuclear Facility in South Carolina. The primary purpose of this study is to detect the possible accumulation of radionuclides in the environs of nuclear reactors in which cooling water is recycled.

An additional data gathering activity that will provide information to the technology assessment program is the study being conducted at the Nuclear Fuel Services Spent Fuel Reprocessing Plant in West Valley, New York. This study is about 90 percent complete.

Accurate measurements of radioactivity release are required to correctly evaluate environmental impact. New techniques for the measurement of krypton-85, tritium and iodine-129 were developed during the year by personnel at the Winchester, Massachusetts Laboratory.

SURVEILLANCE AND INSPECTION

EPA conducts surveillance and inspection programs to obtain base line data on the levels of existing environmental radiation; determine any change occurring in the radiological quality of the environment, the magnitude of this change, and the nature and probable source of the contaminant; provide data for estimating population exposure to ionizing and non-ionizing radiation; and determine if environmental levels are within established radiological guidelines and standards. EPA also publishes periodic environmental radiological quality data from Federal, State and utility surveillance programs.

Specific accomplishments during the past year in this area include the following:

1. Operated national environmental radiological surveillance networks for milk, water, food, and tritium and published the results of these analyses monthly in a section of *Radiation Data and Reports*.

2. Published an addendum to the report, "Radioactive Waste Discharges to the Environment from Nuclear Power Facilities", bringing these data up-to-date through 1970.

3. Completed or initiated contracts with six States (Michigan, New Hampshire, South Carolina, New York, New Jersey and California) to provide timely environmental surveillance data as an input to the National Environmental Radiation Monitoring Program.

4. Supervised a contract with Battelle Memorial Institute for the completion of a draft program for the automatic data processing system for environmental data.

5. Conducted an Analytical Quality Control Service for the radiation data from the State programs. Twenty-three States currently participate in this program and invitations have been issued to about 20 utility companies requesting their participation in a cross-check and standards program.

6. The Western Environmental Research Laboratory participated in Project Cannikin, the underground nuclear detonation conducted at Amchitka, Alaska.

7. Prepared an environmental surveillance guide for the conduct of environmental sampling programs around nuclear power facilities.

8. Provided off-site environmental radiation support for nuclear weapon test activities at the Nevada Test Site and demonstrated feasibility of utilizing aerial sampling techniques for evaluation of radioactive gaseous release from nuclear plants.

9. The Eastern Environmental Radiation Laboratory provided off-site radiation safety support to NASA for Apollo launch.

These programs and studies are being undertaken to protect the public health and welfare from both immediate and long-range environmental impact of the nuclear energy program and from non-ionizing radiation sources. Strategies for achieving these environmental goals have been developed and are continually assessed and reviewed as information from these programs becomes available.

NOISE

Title IV of P.L. 91–604 established the Office of Noise Abatement and Control in EPA on December 31, 1970. EPA's role under this title was to be an interim one, the principal responsibility being to identify and classify causes and sources of noise and to determine their effects on public health and welfare.

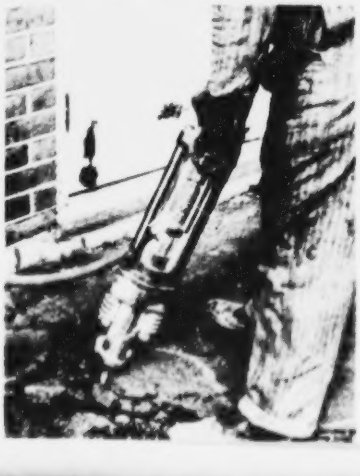
The law called for studies on the effects of noise on people, wildlife, and property and the expected growth of noise problems through the year 2,000. It also authorized EPA to hold hearings and demonstrations to supplement research activities. The results of these efforts were included in a special report to the President and the Congress at the end of 1971.

One source of assistance for the Report was the National Bureau of Standards which has expertise in the noise field. Contracts were negotiated with a number of universities and other organizations with acoustical expertise. Both Federal and private organizations gathered information in the following areas: the effect of noise on living things and property; sources of noise and their current environmental impact; current and future control technology; the economic implications of noise; laws and regulatory schemes for noise abatement; government, industry, professional and voluntary association programs; and an assessment of noise abatement programs and legislation in other nations.

PUBLIC HEARINGS

Shortly after work started on the report, EPA began a series of eight regional public hearings to develop supplementary information on current state-of-the-art on noise pollution control technology and on attitudes of the public, industry and State and local government towards the problem.

The hearings were organized with a panel of experts in the field of noise. In this way, the hearing record included not only the formal presentations of the wit-



A typical source of noise pollution under EPA study.

nesses but also discussions between the witnesses and the experts. Beginning in Atlanta, Georgia, early in July and ending in Washington, D.C., in November, each hearing ran for two to four days and presentations from some 225 witnesses were heard. In addition to witnesses from industry and State and local governments, representatives from 32 different public affairs and environmental organizations also made statements.

Topics covered at the hearings included: noise from construction and transportation equipment, including snowmobiles and other recreation vehicles; noise considerations in architecture and planning activities; laws and enforcement schemes; noise in and around the home; and the physiological and psychological effects of noise. Complete transcripts of each hearing were published and represent an important contribution to literature in the field of noise.

REPORT TO CONGRESS

The results of the public hearings, and the studies of Federal and private organizations formulated the comprehensive Report to the President and the Congress. The following topics are discussed in the Report.

Effects of Noise on Living Things and Property

It has not been demonstrated that people are having their lives shortened by exposure to audible noise. The effects of noise on people have not been successfully measured in terms of excess deaths, shortened lifespan, or days of incapacitating illness. There are only hints that such effects might exist.

However, there is clear evidence that exposure to noise of sufficient intensity and duration can permanently damage the inner ear with resulting permanent hearing losses that can range from slight impairment to nearly total deafness. It can also result in temporary hearing losses, and repeated exposure to noise can result in chronic hearing losses. Evidence is also apparent that noise can interfere with speech communication and the perception of other auditory signals; disturb sleep; be a source of annoyance; interfere with the ability to perform complicated tasks and can especially disturb those tasks that demand speech communication or response to auditory signals; and adversely influence mood and disturb relaxation.

With the exception of the extensive body of literature exploring the effects of noise upon auditory structures and hearing, well controlled experiments substantiating nonauditory effects of noise on animals are rare. In the case of wildlife, such studies are virtually nonexistent.

The ambiguities, and conflicts in reports of nonauditory physiological, metabolic, sexual, and other physical effects of noise suggest the need for a research program to study the effects of long-term low level chronic noise exposure in animals. Concurrently, the effects of noise on true wildlife in its native habitat requires detailed investigation.

There is little data available regarding the effects of acoustical energy on structures other than aircraft, in which case high frequency, high intensity noise has been implicated in mental fatigue in certain components. High intensity, low frequency acoustical energy, such as associated with pulsejets and other high intensity pulsation sources, has been observed to set structural components such as windows, light aluminum or other sheet metals into sympathetic vibratory motions. Since shock and vibration do play a major role in certain types of mechanical deterioration and equipment failures or malfunctions, it is evident that a complex relationship exists.

The heavy concentration of construction equipment in certain urban areas may produce a combination of vibratory energy transmission through soil and supporting structures, which could conceivably affect fragile structures such as glass and certain particularly susceptible materials including plastics and thin aluminum panels. Further investigation is needed on the exact nature of this problem.

Sources of Noise and Their Current Environmental Impact

Several significant observations regarding the nature of noise and the methods of measuring its magnitude are made in this Report. Although many of these conclusions are tentative because of the lack of statistically sound community noise baselines, the general trends appear straightforward and give useful perspective for the overall nature of the problem.

The outdoor daytime residual noise level in a wilderness area, such as the Grand Canyon rim, is on the order of 16 decibels, on the farm 30 to 35 decibels; and in the city 60 to 75 decibels. Areas in which the daytime outdoor median noise level exceeds the range of 56 to 60 decibels, categorized as "noisy urban", are not well suited to detached residential housing.

Areas in which the daytime outdoor median level exceeds 66 decibels are not suited to apartment living unless the buildings are air conditioned, so that the windows may be kept closed to enable conversation indoors. If the outdoor median noise levels are above 71 decibels, special sound proofing is necessary to preserve the indoor noise environment.

A significant increase in noise in the past 20 years has resulted from the rapid growth of commercial aviation and from its use of jet aircraft that are about 10 to 20 decibels noisier than the older, smaller piston engined aircraft. A somewhat lesser increase in noise has resulted from the construction and use of freeways located within urban and suburban residential areas. It is estimated that at least 2000 square miles of urban and suburban area have been severely impacted by noise from these two major sources.

The rapid increase in the use of noisy recreational vehicles and home lawn care equipment powered by poorly muffled internal combustion engines has contributed to noise in both wilderness areas and residential neighborhoods.

Research shows that approximately 22 to 44 million people have lost part of the utility of their dwellings and yards to noise from traffic and aircraft on a continuous basis, and another 21 million at any one time are similarly affected by noise from construction activity. Further, many people are exposed to potentially hazardous noise when operating noisy devices. Although the number thus exposed cannot be accurately assessed, a total of 40 million people might be reasonable.

Thus, not including the contribution of appliances, noise appears to affect at least 80 million people, or 40 percent of the population. Roughly one-half of the total impact of noise represents a potential health hazard (in terms of hearing impairment potential alone), and the remaining half represents an infringement on the ability to converse in the home. Such impact estimates clearly show the need to reduce the number of devices that emit potentially hazardous noise levels and to reduce the outdoor noises that interfere with the quality of life.

Current and Future Control Technology

Much of the Nation's economy and the high standard of living result from technical innovation and the development of new and better machines by industry. Generally, the performance criteria for these machines are defined in terms of the useful work that they will accomplish and the value of this work with respect to its cost. The success of any new product is determined in the market place primarily in terms of the potential economic value of the product to the customer relative to its total cost.

In the case of acoustical devices such as musical instruments, hi-fi sets, and speech communication equipment, sound characteristics are a primary performance criterion. However, for the other devices, noise is generally an unwanted by-product not associated with the primary performance criteria. Only when a need for less noise is articulated, does noise become one of the primary performance criteria. The information feed back process from the public to industry generally takes many years and often presents a conflicting set of needs.

One of the best examples of the possible long-term noise accommodation among industry, public, and the market place is the standard American passenger car. In its 60-year history, it has evolved from a noisy, low-powered vehicle to a relatively quiet efficient high-powered vehicle. Cities and towns set regulations requiring that all cars be muffled in the 1920's. Without further action in the public sector, industry has made progress toward quieting the automobile interior to gain wider acceptability in the market place; and thus has also attained reasonably acceptable exterior noise levels.

TABLE 18.—Order-of-Magnitude Estimates of Exposure to Home Appliance and Building Equipment Noise Expressed in Millions of Person-Hours Per Week

	Speech Interference		Sleep Interference[1]		Hearing Damage Risk	
Noise Source	Moderate	Severe	Slight	Moderate	Slight	Moderate
Group I: Quiet Major Equipment and Appliances						
Fans	1200		0		0	
Air Conditioner	242		121		0	
Clothes Dryer	94		10		0	
Humidifier	10		15		0	
Freezer	0		0		0	
Refrigerator	0		0		0	
Group II: Quiet Equipment and Small Appliances						
Plumbing (Faucets, Toilets)		535	267		0	
Dishwasher		461	4		0	
Vacuum Cleaner		280	0.5		0	
Electric Food Mixer		222	1		0	
Clothes Washer		215	0.5		0	
Electric Can Opener		117	0.2		0	
Electric Knife		1	0.1		0	
Group III: Noisy Small Appliances						
Sewing Machine		19		0.5	9	
Electric Shaver		6		1	5	
Food Blender		2		0.2	0.5	
Electric Lawn Mower		1		1	0.3	
Food Disposer		0.5		0.5	0.5	
Group IV: Noisy Electric Tools						
Home Shop Tools		5		2		1
Electric Yard Care Tools		1.5		.1		0.4

[1] These figures are not directly interpretable in terms of person hours of lost sleep or speech interference.

However, in most product areas, there has not been any method of placing before the public the data to provide for consumer choices between alternatives. Thus, industry has not been able to ascertain what purchasing habits the public might adopt. Source noise standards and implementing regulations should be promulgated for those products which are capable of causing excessive noise. Such standards should have time scales for achievement that are consistent with industrial design, prototype test, and production cycles to encourage the most economical and effective incorporation of noise performance criteria into the design of the product.

Priority should be given to the sources that may constitute a potential hazard for hearing. In addition, priority should be given to all types of aircraft and large highway vehicles associated with the airport and freeway noise. Finally, priority should be given to construction equipment and the noisier elements of city traffic, so that the people living in major cities will be able to enjoy conversation outdoors. Without an effective local, State, and Federal regulatory program, today's noise problems will affect an ever increasing number of people. The technical components of an effective noise abatement plan must include both control of noise at its source and preventive intervention in terms of balanced transportation system planning, land use planning and upgrading of building construction quality.

Economic Implication of Noise

Information on the adverse effects of noise and the costs associated with various types of abatement measures was obtained during public hearings held by EPA. However, the rudimentary state of knowledge regarding costs, benefits, and the impact of abatement expenditures upon the national economy makes it extremely difficult to undertake an economic analysis related to this problem.

As background material, EPA commissioned a study of the economic impact of noise. This study provides a general overview of some aspects of the problem, discusses the limitations of existing data, and indicates the need for additional research and analysis in this area. To evaluate alternative noise abatement strategies, there are three major types of economic considerations to be evaluated: the magnitude of the benefits derived in terms of damages avoided and positive gains attained; the costs of attaining various levels of control included; the impact of abatement costs on the economy. With a better understanding of these economic factors, it should be possible in the future to evaluate alternative control strategies and to identify cost-effective solutions.

Laws and Regulatory Schemes for Noise Abatement

There are some general observations that can be made regarding the laws and regulatory schemes for noise abatement and control. With regard to aircraft noise, there is a jurisdictional problem. State statutes exhibit increased technical proficiency in understanding the evolving technologies for noise control as compared with city ordinances. However, States are constrained in many instances by Federal preemption of the regulatory field (an example being aircraft) or conflicts with interstate commerce matters or other Federal constitutional powers. City ordinances are, in general, vague and technically deficient. However, some city ordinances are becoming more sophisticated through the use of objective standards with decibel levels. The courts are becoming increasingly involved in the controversies over noise control. In general, however, private suits for money damages have not accomplished a great deal regarding noise suppression.

One of the major problems in the State and local levels of government is that of enforcement. In general, noise statutes, no matter how well written, are often rendered ineffective due to insufficient funding and staffing at the local level.

Government, Industry, Professional and Voluntary Programs

State and local efforts on noise control show that over half of the States and cities have no agency responsible for noise abatement, and of those that do have some type of program, the responsibility is fragmented throughout several agencies. Reflecting the local nature of many of the noise problems, a greater percentage of the cities, as compared to the States, have specific noise programs, and personnel assigned to them on a continuous basis.

Most local governments feel that if noise criteria, involving such issues as land use and human reaction to noise, were available in measurable terms, they could develop and implement more meaningful programs appropriate to their local requirements within three to five years.

The importance of the effects of noise abatement and control is reflected by the concerted efforts of many industrial, professional and voluntary associations throughout the country. Their noise abatement research and development programs, their programs in hearing conservation for the protection and well-being of personnel, and their initiative in establishing criteria and standards reflect not only an awareness of a significant problem, but a willingness and ability to attack the problem so it may be resolved or controlled. The efforts of these organizations reflect the absence of governmental influence. Furthermore, their efforts have not been a mere reflex reaction to public dissatisfaction with noise problems that have been projected in recent years. Instead, the efforts of many of the organizations reflect active engagement during the past 15 to 20 years.

Interest in noise and noise related problems is demonstrated by the activities of over 100 professional/industrial organizations. The Acoustical Society of America is perhaps one of the larger professional societies that is directly engaged in a broad spectrum of noise and acoustical problems. It is currently developing a program which will establish means for defining environmental problems in societal and technical terms and for disseminating information to the community.

The Society of Automotive Engineers and the American Society of Mechanical Engineers are two societies that have directed efforts over the years to preparing suggested standards for the safety and protection of the public.

Hearing conservation, since 1947, has received the primary emphasis from the Subcommittee on Noise in Industry of the American Academy of Ophthalmology and Otolaryngology. This group has prepared and distributed guides and manuals, and participated in symposia concerned with industrial hearing loss. Two industrial hygiene organizations, the American Industrial Hygiene Association and the American Conference of Governmental Industrial Hygienists, also have substantial involvements in noise related problems.

The American National Standards Institute is the national organization, representing industry, the individual consumer and the government, which meets demands for voluntary national standards. Through its committees on acoustics, bioacoustics, and shock and vibration, the Institute coordinates the work of standards development in the private sector in the areas of noise and noise related problems.

Activities of professional and industrial organizations are also extended to testing procedures, certification, and rating of various noise producing products. For example, the American Society for testing and Materials has proposed a standard method to test sound absorption and acoustical materials in reverberation rooms.

PROPOSED LEGISLATION

The legislation which established the Office of Noise Abatement and Control also stated that EPA shall be consulted by other Federal agencies in dealing with noise problems which the Administrator has determined to be a public nuisance or otherwise objectionable. This requirement interrelates with those regarding environmental impact statements and Council on Environmental Quality guidelines concerning noise nuisances.

Beginning early in May, 1971, a series of conferences were held with other Federal agencies to review their activities in the field of noise control prior to the issuance of interim guidelines for noise control activities for these agencies. The guidelines are still being reviewed.

Although much has been accomplished, there is still much work to be done. The eventual reduction of noise in the Nation requires the establishment of a balanced set of noise goals that will enable priorities to be set for systematic exploitation of existing technology and development of new technology.

EPA will continue to seek the strengthening of regulatory controls as emphasized by the proposed legislation. The Agency also will continue to evaluate the health hazards of noise and review promising advances in noise suppression.

TABLE 19.—Highlights of Proposed Noise Control Act

FEDERAL PROGRAMS	Coordination of all Federal programs of noise research & noise control.
NOISE CRITERIA, SOURCE IDENTIFICATION, CONTROL TECHNOLOGY	Develop and publish documents on criteria, identifying major sources, and control technology and cost information.
NOISE EMISSION STANDARDS	Adopt regulations setting emission standards for products identified as major sources, from among four specified general categories.
AIRCRAFT NOISE STANDARDS	EPA review process regarding FAA aircraft noise regulations.
LABELING	Promulgate labeling regulations on noise emissions by additional sources (1) capable of affecting public health or welfare, or (2) sold on basis of noise protection qualities.
LOW-NOISE PRODUCTS	Determine low-noise emission products for preferential purchasing by federal agencies.
RESEARCH, TECHNICAL ASSISTANCE AND PUBLIC INFORMATION	Conduct and fund research on effects, measurement and control of noise. Provide technical assistance to state and local governments. Disseminate noise information to the public.
IMPORTS	Assist Secretary of Treasury in issuance of import regulations equivalent to domestic product emission standards and labeling regs.

ECONOMIC IMPACT OF POLLUTION CONTROL

This chapter presents an overview of recent studies which were conducted to assess the economic impacts of air and water pollution abatement requirements on a number of industrial activities.

The studies were conducted under contract with the Council on Environmental Quality, the Environmental Protection Agency, and the Department of Commerce.[*] The Council of Economic Advisers provided guidance on economic methodology for the studies.

Adequate data are not yet available on all the ways in which pollution control requirements will affect industrial activity. Environmental standards as well as the changes being induced in the way materials are extracted, processed, transported, fabricated, consumed and ultimately disposed of are not only extensive but still evolving. Comprehensive studies would require a great deal more time to conduct than was allotted to these preliminary analyses.

In view of these recognized limitations, none of the studies can be considered definitive presentations of total impact on the industrial activities examined or on the economy. However, it is reasonable to believe that the relative relationship of postulated standards and pollution abatement cost consequences are at least indicative of the nature and order of magnitude of the economic impacts.

In general, the studies found that for existing laws the impact of those pollution control costs that were estimated and examined would not be severe in that they would not seriously threaten the long-run economic viability of the industrial activities examined. However, the estimated impact is not inconsequential in that there are likely to be measurable impacts both on the economy as a whole and on individual industries.

BACKGROUND

Pollution abatement regulations have been implemented by government at all levels in order to reduce the substantial and rising costs society has been bearing as a result of pollution. These costs are reflected to varying degrees—sometimes subtly, sometimes directly—in such factors as increased demands for medical services, property devaluations, lost man-hours of productive work, lower crop yields, shorter useful lives of man-made structures, animal losses, and soiling costs, as well as in such considerations as aesthetics and the quality of life.

In the absence of public action, the full costs to society of producing goods are not reflected in the prices of goods since society rather than the producer bears the costs of pollution. Environmental regulations are a means to "internalize" these costs by requiring producers to bear the costs of pollution abatement. As prices change to reflect pollution abatement costs, consumers can be expected to shift their purchases to relatively less expensive goods which are produced with lower pollution abatement costs. Hence, more low-pollution and fewer high-pollution products will be produced. As a result, less pollution will be created, fewer resources will be required for pollution abatement, and more resources will be available for meeting society's demands for other goods and services.

However, the process of reallocating society's economic resources outlined above can in the short run have adverse as well as positive impacts on society. Specifically, transitional economic dislocations may occur. For example, although sales and employment may be rising in one industry while falling in another, the employees laid off from one industry are not likely to be immediately hired by the other industry due to such considerations as geography, skill requirements, and lack of knowledge of job opportunities.

The purpose of the economic impact studies was to begin to develop a better understanding of the nature and order of magnitude of the adverse impacts of environmental regulations on the economy as a whole and on individual industries and regions within the economy.

Although these studies focused on adverse economic impacts, it should be noted that there will be positive economic impacts as well. An example of positive economic impacts, which were not addressed by the microeconomic studies, is increased profits and employment (a) in the industries that produce pollution abatement equipment and services, (b) the industries that produce relatively low-polluting products, and (c) some of the firms in the industries that are impacted by environmental regulations (i.e., firms that absorb the market shares previously held by firms that are not efficient when measured by their use of total resources, including the environment, and thus close when they must incur pollution abatement costs).

Examples of positive economic impacts, which were not addressed by either the microeconomic or macroeconomic studies, are (a) possible productivity in-

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[*] *The Economic Impact of Pollution Control—a summary of recent studies*, March, 1972.

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EPA Federal Laboratory, Research Triangle Park, North Carolina: Determining the effects of carbon monoxide on human performance, while establishing EPA's National Air Standards.

creases where environmental regulations stimulate technological developments (e.g., changes in production processes which both increase productivity and reduce pollution), and (b) increases in the average level of productivity in some industries as environmental regulations result in the closing of plants that are inefficient in their use of total resources. Further, no attempt was made to quantify the economic benefits of a cleaner environment (e.g., higher crop yield, increased man-hours of productive work) or to compare these benefits with the costs of pollution abatement. Finally, since the macroeconomic analysis employs the conventional national income accounts framework, it overstates the net costs (or understates the net benefits) to society because such accounting fails to include the benefits of a cleaner environment.

APPROACH

One macroeconomic study and 11 microeconomic studies were conducted. The macroeconomic study used a computer-based econometric model to determine the impact of pollution abatement costs on such macroeconomic variables as growth of GNP, inflation, unemployment, interest rates and balance of trade and payments.

The microeconomic studies concentrated on major elements of 11 specific industries selected in part because of availability of pollution abatement cost data from the Environmental Protection Agency and in part because they were thought to represent a reasonably complete spectrum of industrial activities that might experience significant dislocations and impacts. The microeconomic studies concentrated on such variables as sales, prices, profits, plant closings, employment and community impacts in the industries studied.

While effects on related (customer, supplier, and competing) industries were examined, the simultaneous impacts on different industries and their cross relationships were not studied in detail.

In interpreting the findings of these studies, it is important to be aware of the nature and limitations of the cost data and the key assumptions which were used. Although these are outlined in each report in detail, some of the major considerations are outlined below:

1. **Cost Definitions.** The investment costs of pollution control equipment were defined to include the direct incremental investment required to attain environmental standards (a) for existing facilities and (b) for new facilities. The operating costs for pollution control equipment were defined to be incremental and net of any productivity increases or by-product revenues. It should be noted that the figures used in these studies sometimes differ from the cost estimates prepared by others. However, in general, a significant portion of such differences can be explained by the fact that the costs were estimated using definitions different from those above.

2. **Water Pollution Abatement Costs.** The water cost data were estimated under the assumption that the relevant standard is the best practicable treatment—roughly the industrial equivalent of secondary treatment. If the pending water quality bill set more stringent standards to be met at any time in the next decade, investment and engineering decisions would undoubtedly be affected and higher costs would result.

3. **Air Pollution Abatement Costs.** The air cost data were estimated in most cases under the assumption that the same set of emission standards would apply in every state. The standards assumed were those published by EPA in the guidelines for developing state implementation plans. If the states adopt different control strategies in order to meet national ambient air quality standards, the costs would vary accordingly. The studies did not include consideration of the proposed sulfur tax.

4. **Other Pollution Abatement Costs.** Only air and water pollution abatement costs associated with Federal standards were considered. If localities implement more stringent standards or other standards (e.g., standards for odors), the total pollution abatement costs would be higher than assumed in these studies. Further, although some solid waste costs were reflected in the air and water estimates, these were not comprehen-

sively estimated. Because the volumes of solid waste, which will require recovery and disposal, will vary appreciably depending upon how air, water and solid waste control requirements are addressed, no meaningful and comprehensive solid waste control costs can as yet be estimated.

5. **Phasing.** The year in which the pollution abatement costs must be absorbed is a significant determinant of economic impact. For the purpose of the studies, it was assumed that all pollution abatement costs for existing plants and for those to be completed by 1976 would be incurred by 1976. Further, it was assumed that the water pollution abatement costs would be incurred in equal increments over the period and that those for air would be incurred over the five year period 1972–1976 in the following annual proportions: five percent, 10 percent, 35 percent, 40 percent, 10 percent respectively.

6. **Time Frame and Coverage.** The microeconomic studies covered only the period 1972–1976. The macroeconomic study covered the period 1972–1980. For the macroeconomic study the cost estimates for the period 1972–1976 included the same estimates as used for the microeconomic studies plus additional estimates of pollution abatement costs for other industries impacted by environmental regulations. For the 1977–1980 period, the cost estimates included (a) the operating and maintenance, interest, and replacement costs on the facilities and equipment installed by 1976 in all industries, plus (b) the capital and operating costs associated with the equipment required for control equipment in facilities expected to be built during the period.

7. **Technology.** Most cost estimates were based on end-of-line control technologies. Since some of these are still in the early stages of development, the actual cost of these technologies may vary considerably, in either direction, from current estimates. To the extent that firms meet abatement requirements by production process changes rather than end-of-line controls, the costs employed in these studies could be over-estimated.

8. **Inflation.** It was assumed that the prices of pollution abatement equipment and services remain constant relative to other prices over the decade. In fact, the prices of pollution abatement equipment and services could rise faster than other prices due to significantly increased demand which is likely to peak in mid-decade. If this occurs, the costs employed in these studies would be understated.

All of the cost data were estimated by the Environmental Protection Agency. Although the data were examined with the assistance of industry experts identified with assistance of the National Industrial Pollution Control Council (NIPCC), the cost estimates provided to the contractors represented the views of the interdepartmental task force and were not necessarily endorsed by the industry experts. The contractors were asked only to assess the economic impact of the cost data given them. They were not asked to assess the accuracy of the cost estimates. Since definitive cost estimates could not be developed, ranges of estimates were given to the contractors so that they could test the sensitivity of the impact to different cost estimates. However, in some cases, additional cost analyses conducted simultaneously with the economic studies indicated that the actual costs could be higher than even the high range of estimates given the contractors. These additional analyses are noted below in summarizing the contractor reports.

MICRO STUDY

The microeconomic studies indicated that none of the industries studied would be severely impacted in that the long-run viability of no industry is seriously threatened solely by the pollution abatement costs estimated. However, profits will decline for some firms in most of these industries because firms will not be able to pass on the full cost of pollution abatement to consumers in the form of higher prices. Costs will not be passed on completely either because substitute or foreign produced products are available so that none of the firms in the industry can pass on their full costs or because the price increases of the smaller firms which have higher unit abatement costs are constrained by those of the larger firms with lower unit abatement costs. Accordingly, some firms will earn lower profits, some will curtail production, and some firms and plants will be forced to close.

However, the studies indicated there will be some price increases as a result of environmental regulations. Depending on the industrial activity in question, prices are likely to rise from zero percent to 10 percent over the period 1972–1976. This is equivalent to average annual increases of from zero percent to two percent with the bulk of the increases likely to come in 1974 and 1975.

Most of the firms or plants that will be forced to close are currently marginal operations (e.g., smaller, older less efficient producers) that were already in economic jeopardy due to other competitive factors. In such cases, the impact of environmental standards is only to accelerate closings that would have occurred anyway. The pollution abatement costs either eliminate already slender profit margins or reduce them to a level at which they fail to justify the required capital expenditures in pollution abatement equipment (in terms of an adequate return on investment).

There are approximately 12,000 plants currently operating in the industrial activities studied. Of these it is expected that approximately 800 would close in the normal course of business between 1972 and 1976. It would appear from the contractors' evaluations that an additional 200–300 will be forced to close because of pollution abatement requirements. Many of these additional closings would appear to involve plants that were vulnerable for other reasons and, hence, that were likely to have closed anyway a few years later.

These plant closings and production curtailments will have both direct and indirect impacts. The direct impacts include the loss of jobs and reduced value of equity. An indirect impact is that related (customer and supplier) firms will be forced to close or reduce production. For example, farms which have marketed their produce to a cannery that closed might be unable to find new markets for their produce. Another indirect impact is that the communities where such plants are located may suffer local recessions—an impact which will be most severe in one-plant towns.

The studies suggest that direct job loss attributable to environmental regulations in the affected industry activities examined may range from 50,000 to 125,000 jobs over the 1972–76 period.[*] These figures represent approximately one percent to four percent of total employment in the industry activities studied. The direct average annual unemployment created in these industries represents .05 percent of the 1970 total national work force. However, the studies suggest that these estimates could be substantially higher if the economy is not at full employment.

While the total plant closings in the industries in which plant closings might have a community impact appear to be about 150, the data presented are not in sufficient detail to determine the number of these communities that will be significantly impacted.

It is important to note that the figures reported in the preceeding paragraphs apply to the industrial activities studied; neither the positive nor negative impacts on other industrial activities have been included. However, in a general sense these other impacts are considered in the macroeconomic study.

In Table 20, a brief description of the impact of pollution abatement costs on each of the industry activities studied is presented.

MACRO STUDY

The macroeconomic study indicated that the national economy will not be severely impacted by the imposition of pollution abatement standards. However, the impact is not insignificant.

In general, the dynamics of impact are as follows. Pollution control costs are assumed to affect the economy in the form of higher product prices and new demands for investments in pollution control facilities by industry ($26 billion in 1971 dollars over the 1972–80 period). Prices rise as a result of the cost-push impact of pollution control costs. In the absence of compensatory macroeconomic policies, the effect of rising prices, which tends to slow the growth of demand in the economy, outweighs the stimulating impact of investments in pollution control facilities. Consequently, the rate of growth of GNP in constant dollars is retarded. The increase in unemployment is tied to the slowdown in real product growth. The current account balance of international trade deteriorates primarily as a result of the increase in domestic prices relative to world prices.[*] Monetary and fiscal policy adjustments can be initiated to completely offset the slowdown in GNP and employment declines but at the expense of more rapid price rises and further decline in the balance of international trade.

The impact of pollution control abatement costs is discussed below in the context of three alternative projections of the national economy:

1. A baseline projection assuming a return to a near full employment economy and no pollution control costs.

2. The addition of pollution control costs to the baseline projection using best estimates of pollution control costs as well as a variant with costs 50 percent higher than the best estimates.

3. The addition of compensatory monetary-fiscal policies and pollution control costs to the baseline projection.

To put these findings in perspective, the key assumptions and possible sources of bias are discussed, followed by a brief description of the methodology employed in this study.

Baseline Projection

The baseline used in this study was constructed to push the economy toward full employment. This trend toward full employment shows the unemployment rate falling to 4.4 percent by 1976. Over the 1971–76 interval, the value of GNP in constant dollars grows at an average annual rate of 5.2 percent and consumer

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[*] These figures represent the total number of people disemployed as a result of environmental regulations. They are not net figures because they do not account for the number of people (conceivably the same people that are disemployed) who find employment in the industry over the same period. In many industries the net figures indicate that more people find jobs than lose them.

[*] For lack of data, this exercise assumes that price increases resulting from pollution control occurs only in the U.S. To the extent that similar price rises do take place in the economies of our major trading partners, the trade effects are overstated.

TABLE 20.—Pollution Control Capital and Operating Costs (All Figures in 1971 Dollars)

Industry	Estimated Average (1972–1976) Annual Control Capital Expenditure ($ Million)	Estimated 1974 Capital Expenditures ($ Million)	Estimated Pollution Control Capital Expenditure as Percent of Estimated 1974 Capital Expenditures	Estimated 1976 Pollution Control Annual Costs ($ Million)	Estimated 1976 Value of Shipments ($ Million)	Estimated Pollution Control Costs as a percent of Estimated Value Value of Shipments	Estimated Total Price Changes 1972–1976
Steel	596	2,000	30%	904	25,500	3.5%	5.5%
Fruit & Vegetable Canning & Freezing	36	350	10%	21	12,300	0.2%	2.0%
Pulp and Paper	251	2,900	9%	198	42,300	0.5%	6.8%
Iron Foundries	70	320	22%	125	4,600	2.7%	3.5%
Petroleum Refining	169	1,690	10%	112	39,100	0.2%	1.5%
Cement	24	130	19%	43	1,800	2.4%	4.5%
Aluminum	228	280	66%	287	3,300	8.6%	6.5%
Copper	68	90	76%	94	2,300	4.2%	4.0%
Lead	14	30	47%	20	560	3.6%	5.0%
Zinc	12	40	30%	27	510	5.3%	5.8%
Baking	3	260	1%	2	12,100	—	—
Leather Tanning	18	20	86%	11	1,100	1.0%	1.5%
Electric Utilities	1,181	8,900	13%	1,388	40,700	3.4%	7.0%
TOTALS	**2,670**	**17,010**	**16%**	**3,232**	**186,170**	**1.7%**	—
Marcoeconomic Study	**3,78[illegible]**	**35,200**	**11%**	**4,550**	**980,000**	**0.4%**	**0.3%**

prices by four percent.** Because this study concentrates on the changes in the economy due to pollution control costs, the specific details of the baseline case are not at issue here.

Impact of Pollution Control Costs

Constant dollar GNP grows more rapidly in 1972 than in the baseline case as a result of additional demand generated by pollution control investments. However, reflecting the impact of higher prices for consumer and capital goods, constant dollar GNP falls below the baseline in 1973 and remains below the baseline throughout the decade. As shown in Table 21, the annual rate of GNP growth averages three-tenths percentage points lower over the 1972–76 interval (average annual growth rate drops from 5.2 to 4.9 percent) and one-tenth percentage points lower over the decade (from 4.8 to 4.7 percent). These averages are not fully informative because the assumed time-phasing of pollution control investments concentrated in 1975–1976 lowers the growth rate by one-half of a percentage point in those years, whereas the economy recovers somewhat near the end of the decade.

The impact on prices is felt immediately, with the most significant increases occurring in plant and equipment prices as a result of cost increases in steel, nonferrous metals and electricity. Over the 1971–76 interval, fixed investment prices rise at an annual rate of five-tenths percentage points above the baseline, while the consumer price index increases by two-tenths percentage points on an annual basis from a baseline average of four percent per year. Here again, the largest price increases occur in mid-decade. Inflationary pressures ease considerably by 1976, and near the end of the decade prices rise at a lower rate than in the baseline case. In large part this is a result of lesser incremental pollution control costs in conjunction with a greater degree of excess capacity in the economy.

The unemployment rate is slightly higher (one-tenth to two-tenths percentage points from a baseline of 4.6 percent) over the decade with employment declines nearly offset by new jobs created by pollution control investments.

Fixed investment, excluding those for pollution control purposes, declines slightly over the decade as a result of slower GNP growth, rising prices and a lower level of capacity utilization in the economy. By 1976, investment levels for non-pollution control purposes are 3.2 percent below the baseline level of $112 billion in 1958 dollars and 1.3 percent below by 1980. Total fixed investment lies above the baseline until 1976 when pollution control investments fall sharply. The resultant decline leaves total fixed investment 8.6 billion below the baseline in 1980.

Net exports of goods and services fall below the base case with imports rising due to domestic price

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**These guidelines were provided to the contractor before the Phase II economic policy was announced.

increases. The current account balance declines by more than $1 billion per year over the 1972–76 period from a baseline of $2 billion in current dollars. Less confidence should be placed on the reliability of these trade results because the model deals with such impacts very crudely. However, given the assumption that foreign prices will not increase due to environmental regulations overseas, it is clear that net exports would decline.

Although the previous results were based on best estimates of pollution control costs, another variant was run assuming that pollution control costs were 50 percent higher, in part to account for any costs which may have been excluded. In general these new results (Table 21) were simply about 50 percent greater than before for nearly all variables, e.g., GNP growth over the 1972–76 interval slowed by .45 percentage points instead of three-tenths. Thus, except for the unemployment rate, which increased by more than 50 percent, variations in economic variables were roughly proportional to the percentage variation in pollution control costs.

Impact with Monetary-Fiscal Policy Adjustments

Assuming that the Federal Government may try to offset some of these impacts, the contractor experimented with monetary-fiscal policy changes in order to bring the economy back to its baseline path with respect to GNP growth and the level of unemployment. Although it is not at all clear that the particular mix of adjustment policies selected by the contractor, relying primarily on government spending, would be the most appropriate one, the results are nevertheless indicative of the magnitude of adjustments required and the impact of expansionary policy changes.

The fiscal stimulus required to return the economy to its baseline growth path is substantial. Federal spending over the nine year projection period sums to over $70 billion above the baseline case, implying annual increases in expenditures less revenues of from seven to $10 billion during the last half of the decade.

This stimulus does bring the economy back to the baseline growth path but in the process it aggravates the impacts on prices and the balance of payments.

TABLE 21.—Average Yearly Baseline Level and Absolute Differences From the Baseline

		Input of Best Estimate of Pollution Control Costs			Input 150% of Best Estimate of Pollution Control Costs		
	Units	72–76	77–80	72–80	72–76	77–80	72–80
GNP—baseline average		872.2	1062.8	956.9	872.2	1962.8	956.9
With Pollution Control Costs (P.C.)	billion of	–4.7	–7.6	–6.0	–7.0	–13.1	–9.7
With P.C. and Monetary Fiscal Policy Offsets*	1958 dolars	0.0	0.0	0.0	.4	1.6	.9
Annual Growth of Constant Dollar GNP—baseline average	percent	5.17	4.35	4.80	5.17	4.35	4.80
With P.C.		–.29	.16	–.09	–.46	.37	–.09
With P.C. and Offsets		0.0	0.0	0.0	.01	–.01	0.0
Unemployment Rate—baseline average	percent	4.82	4.43	4.64	4.82	4.43	4.64
With P.C.		.1	.15	.12	.18	.28	.22
With P.C. and Offsets		.06	0.0	.03	.04	–.02	.01
Net Exports of Goods and Services—baseline average	billions	2.0	.45	1.3	2.0	.45	1.3
With P.C.	of current	–1.2	–.15	–.7	–1.7	.4	–.8
With P.C. and Offsets	dollars	–1.5	–2.5	–1.9	–2.3	–4.3	–3.2
Annual Rate of Inflation (CPI)—baseline average	percent	4.0	3.73	3.87	4.0	3.73	3.87
With P.C.		.23	–.30	0.0	.34	–.78	–.15
With P.C. and Offsets		.29	.23	.26	.49	.36	.43
Fixed Investment Less P.C. Investment—baseline average	billion of 1958 dollars	124.8	153.6	137.6	124.8	153.6	137.6
With P.C.		–2.3	–2.5	–2.3	–3.5	–2.7	–3.1
With P.C. and Offsets		–1.9	–2.8	–2.3	–2.9	–4.3	–3.4

The contractor experimented with monetary fiscal policy adjustments to force the economy back to baseline values of GNP and unemployment. In the case in which costs were increased by 50%, the policy offsets do not quite achieve resumption of baseline product and employment paths only because the contractor lacked the time to refine the policy effects.

Inflationary pressures increase slightly in 1972–76 but do not ease off after that period as they did when only pollution control costs were added. For the 1972–80 period, the consumer price index rises by about one-quarter of one percentage point annually above the baseline.

The sustained price increases further aggravate the current account balance, generating an average annual decline in net exports of about $2 billion per year over the 1972–80 period.

Interest rates were essentially unchanged because the policy adjustments employed in the study were designed to maintain stable interest rates.

In this case, the effect of raising pollution control costs by 50 percent produces somewhat more than proportional impacts on the economic variables. The federal budget deficit must be increased to attain baseline GNP levels while prices and the balance of payments deficit increase by slightly more than 50 percent.

Assumptions and Sources of Bias

This section looks at issues which may have biased the results in the areas of the basic pollution control cost data, the method of inserting costs into the model and the model itself. Finally, a few comments are made concerning the probable direction of bias in the macro-impact results.

1. The Input Data

a. Coverage—pollution control costs were included for 15 industry groups which were considered the major sources of industrial pollution. It is probable that other sectors are affected but the empirical impact is expected to be negligible. As shown earlier, pollution control costs are predominately air and water for industry which exclude costs in the areas of solid waste disposal, governmental water pollution abatement activities and public air pollution abatement. The absence of these figures implies the assumption that there are no incremental costs in industrial solid waste disposal and that no adjustments were made to increase revenues of state and local governments above the baseline projections.

b. Cost data issues—aside from any difficulties in the engineering cost work, there are some conceptual issues, although the direction of possible bias is not clear. For example, investment costs in the water area include a 20 percent upward revision in part to compensate for down time required to install abatement facilities while down time should be reflected as a decline in production, not as an increase in aggregate demand.

c. Cost phasing—phasing patterns clearly have an important impact on the timing of economic effects, e.g., assumptions used herein produce the most significant effects in 1974-76. However, it is not clear that other phasing assumptions would reduce impacts over the decade as a whole.

d. Costs of pollution control facilities—a key assumption underlying the cost data is that the prices of abatement facilities relative to other prices remain constant over the decade. In fact, if new demand is significant enough and especially if demands are bunched, prices of facilities might rise at a much greater rate relative to other prices in the economy. If these effects occur, costs would be understated. Obviously, the time phasing assumption might have a critical impact on the basic cost numbers.

e. Foreign trade assumptions—no allowance was made in the results for any price increases of world prices as a result of pollution control efforts outside the U.S. or the use of higher cost U.S. goods in production processes elsewhere. To the extent that foreign prices do rise, net exports would rise. Further analyses are to be made that consider increases in world prices. There is also a probability that the U.S. may be exporting pollution control equipment in the future, a factor which could improve the balance of trade but has not been included in this study.

2. Problems of the Treatment of Cost Data in the Model

As mentioned above, a critical assumption in this study is that pollution control costs are entirely unproductive. By making this assumption we have by-passed an area of intense controversy where a great deal of research is now taking place.

Land Use in Blythe, California. Documerica Photo

Abatement costs are assumed to be based on end-of-line control technologies. In fact, a lower cost approach may be adopted relying on managerial improvements or changes in basic production processes. Such changes would affect the results both with respect to the magnitude of costs which in turn affects the magnitude of increases in prices and in cost of capital.

There are many ramifications of this issue. For example, pollution control efforts may spur increases in labor productivity because of a more rapid adoption of new technologies, which often tend to produce fewer pollutants per unit of output. It can also be argued that cost increases may eliminate marginal firms and thereby average labor productivity could increase if aggregate demand is maintained at full employment. The results also ignore possible feedbacks on labor productivity from improved health, etc., as a result of less pollution which could lead to results different from those indicated by the study.

3. Problems with the Econometric Model

It is not clear at this point what the nature of bias may be from incorrect specification in the model itself. Clearly the model was not designed to handle the special case of pollution control and thus refinements could be made (such as production functions by industry to account for productivity impacts varying with pollution control technologies). Whether such changes would substantially alter the results reported is not known. One part of the model which may be weak is the trade sector, which is quite simple, including only four-five sectors. For example, if imports fall off more than proportionately as GNP declines, then net exports would not fall as much as they do in current results. Another issue is the inability of the model to capture employment loses due to plant shutdowns or cutbacks as profits, in some cases, are squeezed. Because the model relates unemployment only to aggregate variables, it may understate the impact of pollution control costs on unemployment. While we are not sure bias in the model is significant, we do believe that further study and refinement may be warranted in order to realistically capture pollution control impacts.

4. Possible Direction of Bias

As a result of this complex set of qualifications, in which some have biases in opposite directions and other factors have unknown effects, no statement can be made with confidence about the direction of net bias in the present study.

Methodology

Pollution control costs are assumed to affect the economy in several respects: the efficiency of capital on the aggregate production function is reduced, prices of consumer and capital goods increase, the cost of capital per unit output increases and finally pollution control investments generate new output and employment in industries producing abatement facilities. It is worthwhile emphasizing that the quantitative magnitude of the first three negative impacts hinges importantly on our assumption that pollution control costs are entirely "unproductive" in the sense of generating new capacity in industrial establishments.

1. Prices

Annual costs in the form of percentage cost increases were inputed into the industrial sector of an input-output table. These cost increases are initially converted to first-round price increases by industry markup factors which range from eight-tenths to one. These price increases are then passed on through other industries which use other products as inputs, assuming that all raw material price increases are passed on 100 percent. After taking account of these inter-industry effects, these price increases were passed on through another series of markup factors for final demand components, such as cars, shoes, and plant equipment. This set of price increases is then used to move the economy off the baseline growth path.

2. Aggregate Production Function

Pollution control investments are included as a factor boosting aggregate demand in the economy, thereby generating output and employment, but were not considered to augment the productive or capacity-augmenting capital stock of the nation. No adjustment was made for reducing the efficiency of labor in the aggregate production function, although this effect is probably small compared to that for capital stock.

3. Cost of Capital

Since pollution control expenditures are assumed not to be capacity-augmenting, some further adjustment was necessary to reflect the negative incentive this would have on industry's consideration of new investments which would augment capacity. This adjustment was necessary because the determination of investment in the macro model did not explicitly consider the impact of more capital required per unit of output. This was done by boosting the "user cost of capital" by the ratio of pollution control costs to baseline investment levels. Conceptually, this is equivalent to raising the cost of capital needed to produce a unit of output. To provide some feeling for the complicated set of factors which affect investment (excluding pollution control) demands in the model, we note that it is negatively affected by the slowdown in GNP growth, the rise in capital goods prices, the rise in the cost of capital and by the decline in the degree of capacity utilization. Offsetting these factors to some degree, investment demand is stimulated by the increase in wholesale prices.

POLLUTION ABATEMENT COST SUMMARY

The following tables present EPA's estimates of pollution abatement costs for air, water and solid waste for the period 1972–1976.

Table 22 contains EPA's estimate of the *total* pollution abatement costs to be spent over the period 1972–1976. These costs include the costs that are already being incurred (e.g., municipal trash collection and disposal) plus the additional costs required to meet existing environmental standards by the end of the period.

TABLE 22.—Total Pollution Abatement Costs [*] Aggregate Summary 1972–1976 ($Billion-1971)

Pollutant/Medium	Investment	Annual Cost [A]	Total Cash Annual Cost [A]
Air			
Public	1	3	4
Private			
Mobile	12	16	25
Stationary	11	11	19
Total	24	30	48
Water			
Public			
Federal	1	1	2
Municipal	12	14	22
Private			
Manufacturing	8	8	14
Utilities	3	2	5
Total	24	25	43
Solid Waste	1	35	36
Grand Total	49	90	127

[*] These figures include the costs associated with maintaining the current pollution abatement effort as well as the costs associated with upgrading this effort to achieve existing air and water pollution abatement standards. The derivation of these estimates is explained in "Derivation of Cost Estimates" below.

[A] Annual costs include operating, maintenance, interest, and depreciation.

[B] Cash expenditures include investment plus annual costs less depreciation. For example air pollution control total cash expenditures ($48) equal investment ($24) plus annual costs ($30) less depreciation ($6). Water pollution control total cash expenditures ($43) equal investment ($24) plus annual costs ($28) less depreciation ($9).

Table 23 contains EPA's estimates of only the *additional* costs (over and above those currently being incurred) associated with existing environmental standards.

EPA estimates that $127 billion will be spent on pollution abatement over the period. This is broken down relatively evenly between air, water and solid waste—$48 billion, $43 billion, and $36 billion respectively.

Slightly more than half of this total, $68 billion, will be required over and above current practice to meet existing environmental standards. These additional costs do not break down evenly. Since little air pollution abatement has been practiced, additional expenditures of $43 billion are estimated to be required to meet standards. About half of these are for automobile (mobile source) pollution abatement. In the water area, a great deal of pollution abatement is practiced; hence, only $25 billion of additional costs are estimated to be required. For solid waste disposal, no additional costs are estimated since no new standards have recently been or are expected to be set.

TABLE 23.—Incremental Pollution Abatement Costs [*] Aggregate Summary 1972–1976 ($Billion-1971)

Pollutant/Medium	Investment	Expenditures [A]	Total Cash Expenditures [B]
Air			
Public	1	3	4
Private			
Mobile	11	11	20
Stationary	11	10	19
Total	23	24	43
Water			
Public			
Federal	1	—	1
Municipal	9	3	11
Private			
Manufacturing	5	3	8
Utilities	3	2	5
Total	18	8	25
Solid Waste	—	—	—
Grand Total	41	32	68

[*] These figures include the costs required to upgrade current pollution abatement efforts to achieve existing standards under the Clean Air Act of 1970 and the Federal Water Pollution Control Act of 1967. There are no federal standards for solid waste disposal. The derivation of these estimates is explained in "Derivation of Cost Estimates" below.

[A] Annual costs include operating, maintenance, interest, and depreciation.

[B] Cash expenditures include investment plus annual costs less depreciation.

These pollution abatement cost estimates are based upon the best available information; principally upon the 1972 editions of *Economics of Clean Air* and *Economics of Clean Water*, and upon *1968 National Survey of Community Solid Waste Practices*. In preparing these estimates many assumptions about the phasing of required investments, the rate of industrial growth and the value of equipment in place have been necessary. The actual circumstances may, of course, differ from those assumed. Accordingly, EPA attributes a degree of uncertainty of approximately 20 percent to these estimates.

Cost estimates associated with noise pollution abatement, water pollution abatement for feedlots and construction, radiation controls, land reclamation and disposal of solid waste generated by air and water pollution abatement systems have not been included. Therefore, this summary cannot be considered to be a comprehensive summary of all pollution abatement costs.

Total Pollution Abatement Costs

AIR

Public—Public expenditures were derived from OMB estimates of costs of controlling air pollution from Federal facilities.

Private—

Mobile—Investment costs are based upon the sum of new investments plus assembly line testing as reported in Table 3–7 of the *Economics of Clean Air*. Each fiscal year has been converted to a calendar year by subtracting half of the current fiscal year and adding half of the next fiscal year (i.e. CY'76 = (½×FY'76) + (½×FY'77)). The figures have also been multiplied by 1.05 to convert 1970 dollars to 1971 dollars.

Annual costs are based upon the sum of annual operating and maintenance costs plus gasoline price increases as reported in Table 3–7. Adjustments have been made as above. Estimates of annual depreciation (10%) and interest charges (10%) have been added to the above costs. These have been based upon the accumulated new investments plus assembly line testing from 1968 as reported in the above-mentioned table.

Stationary—Investment costs have been based upon the $10.1 billion investment reported in Table 1–1 of the *Economics of Clean Water*. This has been multiplied by 1.05 to convert 1970 dollars to 1971 dollars.

Annual costs are based upon the $3.9 billion annual costs in 1977 for all stationary sources also reported in Table 1–1. The portion of the total projected investment assumed in place each year was as follows: 1972=five percent; 1973=15 percent; 1974=50 percent; 1975=90 percent; 1976=100 percent. Hence, annual costs were estimated to be 260 percent of the $3.9 billion annual costs reported in Table 1.1.

Depreciation was assumed to be 6.7 percent of the investment in place each year, or 17 percent (6.7 percent×260 percent) of the total projected investment.

WATER

Public—

Federal—Federal expenditures were derived from OMB's estimates of the costs of controlling water pollution from Federal facilities.

Municipal—Municipal investments were derived from page 125 of Volume 2 of the *Economics of Clean Water*. Estimates in current dollars were converted to 1971 dollars by applying an annual inflation factor of 7.5 percent.

Annual costs were based upon the estimated equipment in place in 1971 (Table 4, Volume 1, page 120 of the *Economics of Clean Water*) plus the projected investments. Annual costs were assumed to be 12 percent of equipment in place. Of this total 5.5 percent is interest costs, 3.5 percent is operations and maintenance, and three percent is depreciation.

Private—

Manufacturing—Manufacturing investment was derived from Table 35, Volume 1, page 89 of the *Economics of Clean Water*. These estimates were multiplied by 1.357 to convert from 1967 dollars to 1971 dollars.

Annual costs were based upon the equipment in place in 1968 (Table 33, Volume 1, page 84 of the *Economics of Clean Water*) plus the projected investments. Annual costs were assumed to be 19 percent of equipment in place (7.7 percent interest, 7.3 percent operations and maintenance, 40 percent depreciation).

Electric Utilities—Expenditures for electric utilities were derived from the thermal pollution control costs reported in the *Economic Impact of Pollution Control*. Annual costs include an estimate for the costs associated with thermal loss.

SOLID WASTE

Solid waste expenditures were based upon those reported in the *1968 National Survey of Community Solid Waste Practices*. Investments of approximately $120 million were estimated to have been financed through municipal bond issues in 1967. For the 1972–1976 period it was assumed that $1 billion, or approximately $200 million per year would be invested.

The annual costs of $4.5 billion estimated for 1967 were converted to 1971 dollars using the cost of living price inflator (19.6 percent), and were projected to grow steadily through 1976 at an annual rate of four percent. No estimates of depreciation costs are available.

EPA has not added to these costs any expenditures for upgrading facilities. It is anticipated that any expenditures of this nature will be offset by cost reductions due to increased efficiencies.

These figures are lower than those reported in the Council on Environmental Quality's *1971 Annual Report* for two reasons:

(1) The CEQ report covers a six year period, 1970–1975, rather than a five year period; and,

(2) CEQ includes estimated expenditures for upgrading facilities, where as EPA does not.

Incremental Pollution Abatement Costs

AIR

Public—Public expenditures for air pollution control have been assumed to be entirely incremental.

Private—

Mobile—Incremental investment and annual operating and maintenance costs were assumed to be those listed in Table 3-7 of the *Economics of Clean Air* after adjustment for calendar year less the level of expenditures in 1971 (1971 investment = $342 million, 1971 annual costs = $547). Depreciation and interest were taken to total 20 percent of the accumulated incremental investment.

Stationary—All of the air pollution control expenditures for stationary sources were considered to be incremental.

WATER

Public—

Federal—All of the federal investments in water pollution control were assumed to be incremental. The majority of the annual costs ($200 million/year) were considered to be continuing costs associated with current control practices.

Municipal—Incremental investment expenditures were considered to be the growth plus the backlog investment listed on page 125 of the *Economics of Clean Water* as adjusted to 1971 dollars. Annual costs and depreciation were calculated as a percentage of the accumulated incremental investment in place.

Private—

Manufacturing—Incremental investments were considered to be the net investment plus growth investment from Table 37, Volume 1, page 96 of the *Economics of Clean Water* less the investment reported (excluding depreciation) for the period 1968–1971 in Table 35, page 89 of the same volume. Annual costs and depreciation were calculated as a percentage of the accumulated incremental investment.

Utilities—All of the expenditures for control of the thermal pollution from electric utilities were considered to be incremental.

SOLID WASTE

Because there are no new Federal standards for solid waste disposal, none of the expenditures were considered to be incremental. Costs associated with the control of air pollution from incinerators are included in the air pollution control cost estimates.

REGIONAL, STATE AND LOCAL ACTIVITIES

I want to assure you that we have no ambition to usurp the State role or to coerce States into action. We hope only to lead, to guide, to offer vital assistance and to maintain the strengths of different State attacks on environmental degradation. I also want to assure you that if the States do not act, the Federal Government will.

William Ruckelshaus
February 8, 1971.

Since the citizens of one State cannot be expected to protect the air and water of the citizens of another State, a Federal presence is needed as long as the pollution which clouds the air and clogs the streams respects no political boundaries. This Federal presence is needed also to enable all States to meet their responsibility to the environment fairly. The separate States compete for industry to provide jobs for their citizens, revenues for their government, and prosperity for their merchants. That competition cannot be allowed to lure some States into relaxing their regulatory role at the expense of the environment. The Federal presence behind the States strengthens EPA's role as regulator, insuring that no State should suffer disadvantage because of vigilant protection of its environment.

To enable States to fight pollution, EPA has set up 10 Regional Offices to assist States and to administer State and local assistance grants. EPA's Washington Headquarters administers additional grants.

A strong feature of EPA is an emphasis on decentralization. To enable the Agency to work closely with all levels of State and local government and industry, the Administrator decided to establish 10 Regional Offices along boundaries aready in use by other Federal agencies. He announced that much of the work of the Agency would be done through the Regional Offices, headed by Regional Administrators.

The Regional Administrators possess broad authority to act for EPA in matters within their jurisdiction. They exercise authority in the fields of enforcement, surveillance and analysis, and air, water, pesticides, solid waste, and radiation program operations, including EPA's State and local assistance grants programs.

STATE AND LOCAL ASSISTANCE PROGRAMS

The job of controlling pollution is an enormous one, both in terms of costs and in terms of manpower requirements. Few, if any, State and local governments have revenues large enough to meet the many and increasing demands confronting them. The largest share of EPA's resources are, therefore, spent for direct assistance to States and communities. EPA's State and local assistance grants programs represent 85 percent of EPA's budget. These programs have been decentralized and are now administered through the Regional Office structure. This decentralization places Regional Administrators in a position to be more effective and more responsive to the needs of States and localities in environmental matters. These grants include Waste Water Treatment Works Construction Grants, Water Pollution Control, State and Interstate Program Grants, Water Pollution Control Comprehensive Basin Planning Grants, Air Pollution Control Program Grants, and Solid Waste Planning Grants.

Grants Procedural Process

The establishment of EPA brought together 21 separate, categorical grant programs which had been operating in the predecessor agencies. EPA's initial objective was to integrate these grant activities into a common framework to support the Agency's mission and to respond to the President's desire and efforts to reform the grant-making processes of the government. EPA has standardized grant regulations, policies, forms, and reporting procedures; consolidated all research, demonstration, and training programs in Headquarters, with a centralized grants administrative function serving all programs; and decentralized State and local assistance grant programs to the Regional Offices.

EPA has been actively involved in the President's Federal Assistance Review (FAR) Program to streamline Federal domestic assistance by increasing reliance on State and local governments and other recipients of Federal assistance, improving interagency coordination, and improving intra-agency assistance systems. The Agency has been strengthening liaison with (a) Federal Regional Councils (established in the 10 Federal Regions to develop and maintain close working relationships with State and local governments, to coordinate grant programs in a manner responsive to other levels of government, and to develop means to react better to specific regional, State, and local problems); and (b) Federal Executive Boards (operating in 25 cities, to provide association of top executives in support of government-wide Presidential policies, to help solve community problems, and to enhance the image of the

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TABLE 24.—Allocation of Grant Funds for Wastewater Treatment Works Construction

State or Territory	1970	1971	1972	1973 Estimated
*Alabama	$ 14,672,000	$ 14,680,000	$ 18,745,300	$ 50,118,000
*Alaska	1,637,900	1,622,500	3,835,500	4,398,000
Arizona	6,327,100	6,316,000	7,742,700	25,794,000
*Arkansas	8,599,200	8,580,800	8,401,500	27,987,000
*California	65,554,900	65,557,000	141,049,600	290,352,000
*Colorado	8,072,600	8,084,200	9,642,600	32,118,000
*Connecticut	11,117,600	11,117,800	64,227,400	44,124,000
*Delaware	2,541,600	2,571,000	3,894,000	7,977,000
*District of Columbia	3,780,500	3,788,000	14,746,000	11,007,000
*Florida	21,353,200	21,331,100	53,127,400	98,799,000
Georgia	17,305,100	17,289,000	29,299,300	66,786,000
*Hawaii	3,398,600	3,410,900	5,440,500	11,202,000
*Idaho	3,743,800	3,787,400	5,038,900	10,374,000
*Illinois	42,287,100	42,294,100	89,236,800	161,727,000
*Indiana	20,042,500	20,052,000	37,601,300	75,576,000
*Iowa	12,203,800	12,221,800	21,513,200	41,109,000
Kansas	9,839,400	9,812,200	9,825,300	32,727,000
Kentucky	13,625,800	13,609,300	14,063,400	46,845,000
*Louisiana	14,513,900	14,510,200	25,744,300	53,016,000
*Maine	4,981,500	4,994,600	9,971,900	14,460,000
*Maryland	13,550,900	13,550,700	48,867,400	57,078 000
*Massachusetts	21,983,500	21,980,200	40,852,600	82,788,000
*Michigan	33,033,200	33,043,400	118,966,400	129,147,000
*Minnesota	14,928,100	14,930,100	24,972,100	55,371,000
*Mississippi	10,377,700	10,359,900	19,115,600	32,259,000
*Missouri	18,690,000	18,690,300	35,753,100	68,064,000
*Montana	3,714,500	3,724,200	3,033,900	10,104,000
*Nebraska	6,668,600	6,674,300	6,481,800	21,591,000
Nevada	1,881,900	1,888,000	2,134,800	7,113,000
*New Hampshire	3,369,200	3,367,200	7,763,300	10,734,000
*New Jersey	25,737,700	25,741,700	67,854,500	104,310,000
*New Mexico	4,958,900	4,976,300	7,179,100	14,784,000
*New York	69,938,200	69,927,900	373,045,800	264,705,000
North Carolina	19,881,800	19,863,000	22,700,300	73,953,000
*North Dakota	3,626,400	3,632,000	2,699,100	8,988,000
*Ohio	40,850,400	40,849,800	79,573,100	155,004,000
*Oklahoma	10,596,800	10,588,200	11,170,800	37,242,000
*Oregon	8,134,100	8,138,900	12,935,900	30,432,000
*Pennsylvania	47,534,200	47,525,100	94,642,100	171,621,000
*Rhode Island	4,341,100	4,338,400	6,911,400	13,821,000
South Carolina	11,028,700	11,021,800	11,466,600	37,695,000
South Dakota	3,815,600	3,799,800	2,910,600	9,696,000
*Tennessee	15,815,700	15,814,700	35,430,300	57,102,000
*Texas	40,479,900	40,467,200	48,912,300	162,930,000
Utah	4,655,900	4,672,900	4,626,900	15,414,000
*Vermont	2,542,800	2,528,700	3,193,100	6,471,000
*Virginia	17,302,800	17,295,300	33,849,100	67,644,000
Washington	12,528,700	12,536,600	15,142,300	49,608,000
West Virginia	8,798,000	8,805,000	7,619,400	25,383,000
*Wisconsin	17,130,900	17,137,000	52,319,600	64,287,000
*Wyoming	2,240,300	2,248,600	1,451,700	4,836,000
*Guam	1,667,200	1,649,400	614,200	1,236,000
*Puerto Rico	11,085,000	11,067,200	22,108,400	39,465,000
*Virgin Islands	1,523,200	1,505,400	546,700	909,000
*American Samoa				396,000
*Trust Terr of Pac				1,323,000
Subtotal	800,000,000	800,000,000[1]	1,800,000,000	3,000,000,000
Allocation for serious water pollution problems	—	200,000,000	200,000,000	[4]
Total	$800,000,000	$1,000,000,000	$2,000,000,000[2]	$3,000,000,000[3]

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*States and Territories with matching grants programs (as of 10/15/71)

[1] Although the total allocation is identical in 1970 and 1971, the existing formula in Section 8(c) of the Federal Water Pollution Control Act, as amended, provides that per capita income of each State is the basis for allocating a portion of the appropriation. Therefore, a change in a State's per capita income from the latest two years available would cause a change in their allocations for 1970 to 1971.

[2] FY 1972 allocation based on administration proposed revision to Section 8.

[3] FY 1973 allocation based on $3 billion dollars distributed by population among States.

[4] $200 million for serious pollution problems is incorporated in reallocation of the above funds.

Federal Government as a model enterprise in the community). EPA participation in these programs has developed rapidly. The Agency now is a full member on all 10 Federal Regional Councils and an active participant on most Federal Executive Boards.

Wastewater Treatment Works Construction Grants

The Wastewater Treatment Works Construction Grants, EPA's largest program, assists in the construction of waste treatment works to prevent the discharge of untreated or inadequately treated sewage or other wastes into any waters. These grants are much needed because of the rapid population growth in urban centers. In 1956, a program was initiated to provide Federal funding to communities to streamline or build sewage treatment facilities. Today, municipalities, States, and interstate agencies can service grants of at least 30 percent of the cost of the project. These grants may be increased to 50 percent if a State is paying at least 25 percent of the total cost. From the inception of the Federal grant program in 1957, through July 1971, nearly $3 billion had been provided for over 12,000 projects. During the last half of 1971, the level of funding rose to $2 billion annually. By the end of 1974, EPA expects to have projects funded and underway that will provide secondary treatment for almost all municipal waste water.

EPA provides localities funds for the construction of modern treatment plants, including experimental pilot plants that might well demonstrate a better, more efficient way of disposing of municipal sewage. In the past year, a number of these projects showed promise. Among them:

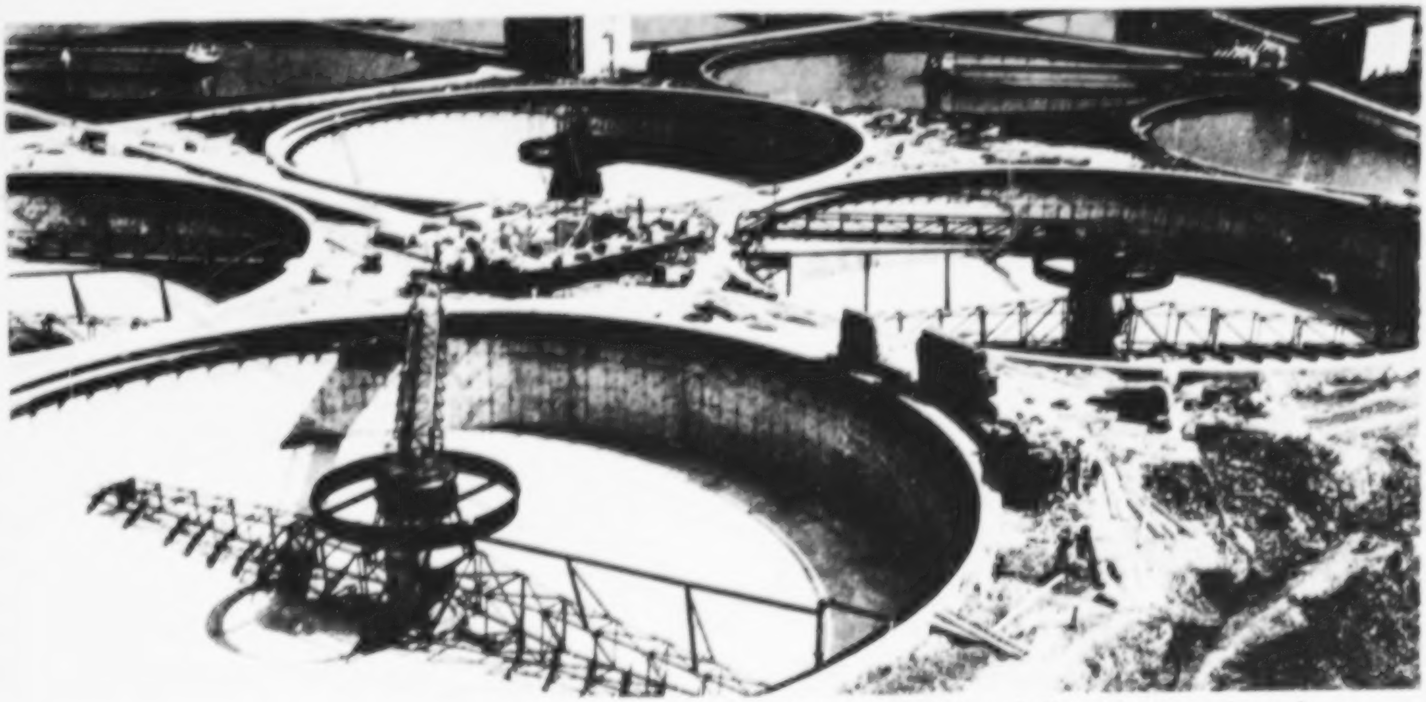
> A full scale demonstration of the removal of phosphates from water by the addition of minerals with minimum modification of the installation in Richardson, Texas.
>
> The technical and economic practicality of utilizing waste "pickle liquor" (ferrous chloride) to remove phosphorus from raw sewage has been developed in some six different projects.
>
> A small scale plant study at Batavia, New York, has demonstrated that the use of pure oxygen instead of ordinary air in secondary treatment can increase the capacity of the sewage treatment plant significantly.
>
> Another plant study in St. Michaels, Maryland, has demonstrated how secondary treatment effluent can be disinfected with ultra-violet light.
>
> A method of regenerating powdered carbon for sewage treatment has been developed on a small pilot plant scale at Lebanon, Ohio.

Water Pollution Control State and Interstate Programs Grants

The Water Pollution Control Act authorizes EPA to assist State and interstate agencies in establishing and

TABLE 25.—Assistance From Other Federal Agencies for Wastewater Facilities and Related Projects

Legislation	Lead Agency	Purpose of Grant	Max. Federal Grant	EPA Role	Approximate Funding Level
Appalachian Regional Development Act of 1965	Department of Commerce	Increase contributions for public works projects in Appalachia	80% of project costs	EPA administers Sections 212 and 214 of this act and receives funding on a transfer basis from Commerce	Approximately $4.0 million per year ($2.4 million received through 2/28/71)
Public Works and Economic Development Act of 1965	Department of Commerce	Increase Federal grants for public works in economically distressed areas	80% of project (100% on Indian reservations)	EPA administers grants for waste treatment works after funds transferred from Commerce. EPA also certifies for adequacy sewer loans and grants	EPA administers approximately $6–$10 million annually (4.4 million received through 2/28/71). Additional $5–10 million administered by commerce for sewer loans and grants.
Housing and Urban Development Act of 1965	HUD	Loans and grants for water supply and collecting sewers	50% of project costs	EPA certifies for adequacy sewer loans and grants	Approximately $150 million per year (55% water supply & 45% collecting sewers). Fy 1972—$100 million in this approximate ratio—$100 to revenue sharing after 1/1/72
Consolidated Farmers Home Administration Act	Department of Agriculture	Loans and grants, water supply, sewers, and waste treatment facilities in rural areas.	50% of project costs	None	For water supply, sewers, and waste treatment facilities in Fy 1972—$42.0 million.



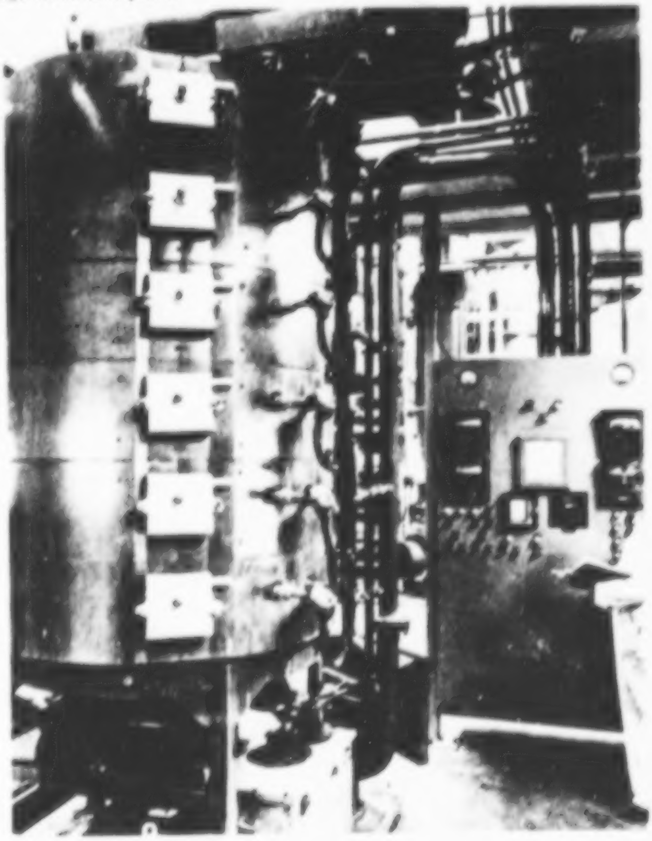
Washington, D.C.: Four clarifiers under construction at the Blue Plains sewage treatment plant, supported jointly by EPA and the Washington, D.C. Dept, of Sanitary Engineering.

maintaining adequate water pollution control programs. This program began in 1957 with an annual funding of $2 million. As of Fiscal Year 1971, the annual figure had grown to $10 million, and State and interstate agency expenditures have increased more than seven times. These funds have been utilized for all phases of State and interstate agency programs, including technical assistance and planning, laboratory and field equipment, training programs, monitoring and surveillance, and enforcement activities. To qualify for a grant, each State and interstate agency must prepare a plan describing how the grant will be utilized to strengthen its pollution control program. Funds are pro-rated on the basis of financial need, population and the extent of the water pollution problem. States must provide matching funds based on per capital income, from a minimum of 33⅓ percent of the Federal amount to a maximum of 66⅔ percent of the Federal amount.

Air Pollution Control Programs

Air Pollution Control Program grants are awarded directly to air pollution control agencies to equip State and local governments to prevent and control air pollution. The Clean Air Act provides for funding for planning new programs, developing these programs, establishing programs which have been authorized by State and local government and improving and maintaining existing programs for the prevention and control of air pollution. Funds also are designated to support program planning activities in air quality control regions as part of a regional approach to the control of air pollution. The result has been a significant expansion of State and local activity. In Fiscal Year 1971 there were 51 State control programs and 153 local and regional programs. EPA supplies up to 75 percent of the funding to regional programs, up to 66⅔ percent to control

Washington, D.C.: Recalcinating furnace at Blue Plains sewage treatment plant.



agencies for improvement grants, up to 60 percent to regional programs and up to 50 percent to control agencies for maintenance grants. Program maintenance grants assure State and local governments that EPA will continue to support their efforts. Support to air pollution control agencies will continue as long as air quality objectives and State implementation objectives are met.

Water Pollution Control Comprehensive Basin Planning Grants

Water Pollution Control Comprehensive Basin Planning Grants serve as an incentive to State and local governments to cooperate in the development of plans for the cleanup of a river basin or a portion of one. These plans, after development by State or local agencies, certification by the Governor and approval by EPA, provide the basis for the public investment to construct water treatment facilities. The plans consider both point and nonpoint sources; alternative strategies, including possibilites of regionalizations; institutional and management requirements; and environmental issues. As an example, the recently completed Dallas-Fort Worth regional plan developed by the North Central Texas Council of Governments provides the full methodology which will guide the public investment of $600 million in waste treatment facilities over the coming years. This plan provides the intense detail required to meet the water quality goals for the upper Trinity River Basin, and will be fully integrated with a similar plan in the Houston area, in the lower Trinity River. An interesting feature of the Upper Trinity plan is the location of proposed industrial areas adjacent to the waste treatment facilities, so that treated waste waters can be utilized by industry.

The planning agencies in the Trinity Basin received a 50 percent planning grant from EPA. Thirty-eight agencies are now receiving such grants. To date, EPA has approved plans for more than 400 basin and regional areas throughout the Nation.

TABLE 26.—Summary of Grants for State and Local Control Agency Programs

State or Territory	1971			1972		
	Air	Water	Total	Air	Water	Total
Alabama	$ 43,203	$ 190,500	$ 233,703	$ 405,926	$ 277,350	$ 683,276
Alaska	55,466	20,000	75,466	61,387	30,600	91,987
Arizona	347,500	75,500	423,000	347,500	115,200	462,700
Arkansas	90,152	115,700	205,852	269,884	168,900	438,784
California	2,870,044	661,100	3,531,144	4,134,262	1,008,000	5,142,262
Colorado	522,000	88,000	610,000	522,000	136,350	658,350
Connecticut	530,869	167,400	698,269	770,512	251,250	1,021,762
Delaware	205,112	85,900	291,012	231,932	129,000	360,932
District of Columbia	234,134	87,800	321,934	234,134	130,200	364,334
Florida	949,918	266,300	1,216,218	1,113,975	415,200	1,529,175
Georgia	552,829	218,700	771,529	801,798	320,700	1,122,498
Hawaii	27,605	71,100	98,705	60,695	103,500	164,195
Idaho	64,937	44,100	109,037	127,634	65,850	193,484
Illinois	1,468,457	428,000	1,896,457	2,337,857	646,350	2,984,207
Indiana	512,615	230,000	742,615	1,142,721	350,700	1,493,421
Iowa	215,112	121,200	336,312	470,426	184,950	655,376
Kansas	141,324	97,600	238,924	296,999	143,850	440,849
Kentucky	535,614	165,000	700,614	670,413	246,000	916,413
Louisiana	183,916	184,100	368,016	487,649	269,400	757,049
Maine	74,093	63,000	137,093	202,273	95,400	297,673
Maryland	1,426,251	181,300	1,607,551	1,426,251	275,850	1,702,101
Massachusetts	698,009	264,600	962,609	1,129,922	401,700	1,531,622
Michigan	1,533,572	357,800	1,891,372	2,150,442	540,150	2,690,592
Minnesota	447,798	155,400	603,198	648,428	237,000	885,428
Mississippi	95,359	145,100	240,459	290,416	205,800	496,216
Missouri	772,226	196,700	968,926	956,945	296,100	1,253,045
Montana	135,086	39,000	174,086	186,985	59,250	246,235
Nebraska	133,408	66,400	199,808	211,694	101,550	313,244
Nevada	163,000	24,900	187,900	163,000	38,250	201,250
New Hampshire	55,869	63,500	119,369	130,409	97,350	227,759
New Jersey	1,587,669	311,900	1,899,569	2,053,369	468,300	2,521,669
New Mexico	257,558	52,300	309,858	257,558	79,650	337,208
New York	2,836,675	650,400	3,487,075	4,178,741	968,100	5,146,841
North Carolina	620,180	264,600	884,780	965,362	387,600	1,352,962
North Carolina	21,456	37,200	58,656	65,343	56,100	121,443

Solid Waste Planning Grants

The Solid Waste Planning Grants program awards grants to State, interstate, municipal, and intermunicipal agencies for developing comprehensive plans for solid waste management, in coordination with State air and water pollution control plans. EPA will fund up to two-thirds of the costs for these planning programs. Agencies have typically used their grants, in addition to surveys and plans, to develop and pass legislation and regulations, and to carry on public relations and information activities.

Solid waste management plans are basically oriented toward the development of policies and procedures in order to guide the activites of State solid waste management agencies in solving their problems. The plans also provide a framework within which local and regional plans might be formulated and provide support for legislation. Interstate plans, on the other hand, are more oriented to the design of operating-level regional systems including collection, transportation, disposal, possible reclamation and reuse and overall management systems. Plans formulated at each level are coordinated with comprehensive plans of each respective jurisdic-

TABLE 26.—Summary of Grants for State and Local Control Agency Programs* (Continued)

		1971			1972	
State or Territory	Air	Water	Total	Air	Water	Total
Ohio	1,257,189	447,300	1,704,489	2,199,387	671,700	2,871,087
Oklahoma	236,877	117,600	354,477	344,004	177,000	521,004
Oregon	567,650	96,900	664,550	639,403	148,350	787,753
Pennsylvania	2,562,671	488,300	3,050,971	3,005,808	734,100	3,739,908
Rhode Island	106,473	111,000	217,473	188,675	163,200	351,875
South Carolina	345,623	157,400	503,023	516,948	226,500	743,448
South Dakota	33,441	38,500	71,941	64,441	58,350	122,791
Tennessee	801,281	208,200	1,009,481	881,045	306,450	1,187,495
Texas	1,426,216	427,000	1,853,216	2,038,558	636,900	2,675,458
Utah	101,551	55,400	156,951	133,944	84,150	218,094
Vermont	59,920	43,700	103,620	84,302	66,300	150,602
Virginia	478,067	210,500	688,567	722,294	312,600	1,034,894
Washington	1,125,000	136,300	1,261,300	1,125,000	205,950	1,330,950
West Virginia	256,462	110,200	366,662	376,631	161,400	538,031
Wisconsin	199,494	193,000	392,494	701,071	299,250	1,000,321
Wyoming	33,536	23,600	57,136	53,041	36,300	89,341
American Samoa	219	—	219	3,005		
Guam	10,823	75,000	85,823	21,272	111,450	132,722
Puerto Rico	149,310	195,000	344,310	254,850	288,750	543,600
Virgin Islands	39,181	73,000	112,181	41,479	109,800	151,279
Subtotal	30,200,000	9,400,000	39,600,000	42,900,000	14,100,000	57,000,000
		1971			1972	
Interstate Agencies	Air	Water	Total	Air	Water	Total
Delaware River Basin Commission (Delaware, New Jersey, New York, Pennsylvania)	—	133,500	133,500	—	200,250	200,250
Interstate Commission on the Potomac River Basin (District of Columbia, Maryland, Pennsylvania, Virginia, West Virginia)	—	50,400	50,400	—	76,800	76,800
Interstate Sanitation Commission (Connecticut, New Jersey, New York)	—	137,800	137,800	—	207,450	207,450
New England Interstate Water Pollution Control Commission (Connecticut, Maine, Massachusetts, New Hampshire, New York, Rhode Island, Vermont)	—	87,400	87,400	—	132,450	132,450
Ohio River Valley Water Sanitation Commission (Illinois, Indiana, Kentucky, New York, Ohio, Pennsylvania, Virginia, West Virginia)	—	190,900	190,900	—	283,050	283,050
Subtotal	—	600,000	600,000	—	900,000	900,000
	30,200,000	10,000,000	40,200,000	42,900,000	15,000,000	57,900,000

* Water Grants are made to State or Interstate Agencies.
Air Grants are made to State or Local Agencies.

tion, and take into account other environmental problems, population, land use, capital and operating budgets, public facilities, pertinent regulations, governmental framework and transportation systems. To accomplish this, EPA now has solid waste planning grants with 46 states, five interstate agencies, and eight regional

TABLE 27.—Grantees Under Section 3(C) Water Basin Planning Grants 1968 to 1971

(AWARD PERIODS SHOWN IN PARENTHESES)

ARKANSAS

Northwest Arkansas Regional Planning Commission—Upper White River, Fayetteville-Springfield Area (3/71-3/74)

CALIFORNIA

California Water Resources Control Board—San Francisco Bay Delta (6/68-6/71)

Humboldt County California Board of Supervisors—Humboldt Bay (6/69-6/71)

Santa Ana Watershed Planning Agency—Santa Ana River Basin (11/68-11/71)

Association of Monterey Bay Area Governments—Monterey Bay Area, Monterey Bay SMSA (1/71-1/74)

Joint Administrative Committee of Santa Marqarita—San Luis Rey Rivers, Santa Marqarita (11/71-6/73)

COLORADO

Denver Metropolitan Regional Council of Governments—Upper South Platte River Basin, Upper Denver SMSA (6/71-6/73)

FLORIDA

East Central Florida Regional Planning Council—Oklawaha River Basin (2/70-2/73)

Tampa Bay Regional Planning Council—Tampa Bay, Tampa Bay-St. Petersburg SMSA (3/71-3/74)

Metropolitan Dade County — Florida East Coast, Miami SMSA (6/71-6/73)

Jacksonville SMSA (11/71-6/73)

West Palm Beach SMSA (11/71-6/73)

IDAHO

ADA of Governments Council—Boise River Basin, Boise SMSA (12/70-12/73)

INDIANA

Indianapolis Department of Metropolitan Development—White River, Indianapolis SMSA (6/71-6/73)

IOWA

Dickenson County Board of Supervisor—Spirit Lake (11/71-6/73)

MAINE

Northern Maine Regional Planning Commission—Aroostook and Prestile River Basins (11/70-5/72)

MARYLAND

Maryland Environmental Service—Baltimore Harbor (2/69-2/72)

MINNESOTA

Metropolitan Council of the Twin Cities Area, Mississippi River Basin, Minneapolis-St. Paul SMSA (2/70-2/73)

St. Cloud Metropolitan Area Sewer Commission, Mississippi River Basin, St. Cloud Area (10/70-10/72)

MISSISSIPPI

Pearl River Basin Jackson SMSA (11/71-6/73)

Pat Harrison Waterway (11/71-6/73)

MISSOURI

East-West Gateway Coordinating Council-Mississippi River Basin, St. Louis County Area (12/70-12/72)

NEBRASKA

Nebraska Soil and Water Conservation Commission-Salt Creek-Lincoln SMSA (12/70-12/72)

NEVADA

Clark County Nevada Board of Commissioners—Las Vegas Wash (11/68-11/71)

NEW YORK

Erie & Niagara Counties Regional Planning Board—Niagara River, Buffalo SMSA (6/71-6/73)

OHIO

Ohio Department of Natural Resources—Great Miami River (12/68-12/71)

OREGON

Lane Council of Governments—Willamette River Eugene SMSA (3/69-3/72)

Coos-Curry Council of Governments—Southern Oregon Coast (4/71-4/71)

PUERTO RICO

Environmental Quality Board—Commonwealth of Puerto Rico (3/69-3/72)

SOUTH DAKOTA

Black Hills Conservancy Sub District—Cheyenne River Basin—Belle Fomche River Basin (10/70-10/73)

TEXAS

Guadalupe-Blanco River Authority—Guadalupe River Basin (6/69-6/72)

North Central Texas Council of Governments—Upper Trinity Basin, Dallas SMSA & Fort Worth SMSA (5/68-5/71)

Sabine River Authority—Sabine River Basin, Texas & Louisiana (6/70-6/73)

San Antonio River Authority—San Antonio River Basin (5/70-5/73)

Texas Water Quality Control Board—Galveston Bay Area (12/70-12/73)

Trinity River Authority—Middle Trinity River Basin (11/71-6/73)

UTAH

Salt Lake, Provo-Orem SMSA (11/71-6/73)

VIRGINIA

Virginia Statewater Control Board—Lower James River, Richmond SMSA, Petersburg-Colonial Heights SMSA, Norfolk-Portsmouth SMSA, Hampton-Newport News SMSA (6/71-6/73)

WASHINGTON

Municipality of Metropolitan Seattle—Green & Cedar River Basins, Seattle SMSA (6/71-6/73)

Walla Walla Regional Planning Commission—Walla Walla County (11/71-6/73)

Snohomish County—Seattle SMSA (11/71-6/73)

WISCONSIN

Southeastern Wisconsin Regional Planning Commission—Milwaukee River Basin (5/68-5/71)

INTERSTATE

NEBRASKA-IOWA

Omaha-Council Bluffs Metropolitan Area Planning Agency—Missouri River Basin, Omaha-Council Bluffs SMSA (9/69-9/72)

KANSAS-MISSOURI

Kansas City SMSA Metropolitan Planning Commission — Missouri River Basin, Kansas City Region (1/71-1/74)

WISCONSIN-MINNESOTA

Duluth-Superior Council of Governments—St. Louis River Basin (11/71-6/73)

TABLE 28.—Solid Waste Planning Grants Under Section 207

(START DATE SHOWN IN PARENTHESES)

ARIZONA
Department of Health (7/1/71)

ARKANSAS
Pollution Control Comm. (10/1/67)

CALIFORNIA
Department of Health (6/1/66)

COLORADO
Department of Public Health (6/1/66)

CONNECTICUT
Department of Health (6/1/66)

DELAWARE
Department of Health and Social Services (6/1/67)

DISTRICT OF COLUMBIA
Department of Sanitary Engin. (2/1/68)

FLORIDA
Department of Health & Rehabilitative Service (6/1/67)

GEORGIA
Department of Public Health (9/1/66)

HAWAII
Department of Health (6/1/66)

IDAHO
Department of Health (6/1/66)

INDIANA
Board of Health (12/1/69)

IOWA
Department of Health (7/1/71)

KANSAS
Department of Health (2/1/68)

KENTUCKY
Department of Health (6/1/66)

LOUISIANA
Board of Health (9/1/166)

MAINE
Department of Health and Welfare (6/1/66)

MARYLAND
Department of Health & Mental Hygiene (1/1/67)

MASSACHUSETTS
Department of Public Works (7/1/69)

MICHIGAN
Department of Public Health (6/1/67)

MINNESOTA
Pollution Control Agency (6/1/68)

MISSISSIPPI
Board of Health (3/1/69)

MISSOURI
Division of Health (8/1/68)

MONTANA
Department of Health (6/1/67)

NEBRASKA
Department of Health (7/1/71)

NEW HAMPSHIRE
Department of Health & Welfare (6/1/70)

NEW JERSEY
Department of Environmental Protection (6/1/66)

NEW MEXICO
Health and Social Services Department (10/1/67)

NEW YORK
Department of Environmental Conservation (6/1/66)

NORTH CAROLINA
Board of Health (9/1/66)

NORTH DAKOTA
Department of Health (7/1/67)

OHIO
Department of Health (9/1/66)

OKLAHOMA
Department of Health (6/1/66)

OREGON
Department of Environmental Quality (9/1/66)

PENNSYLVANIA
Department of Environmental Resources (6/1/66)

RHODE ISLAND
Public Utility Commission (6/1/66)

SOUTH CAROLINA
Pollution Control Authority (6/1/66)

SOUTH DAKOTA
Department of Health (9/1/68)

TENNESSEE
Department of Public Health (1/1/67)

TEXAS
Department of Health (1/1/67)

UTAH
Department of Social Services (9/1/67)

VERMONT
Agency of Environmental Conservation (7/1/69)

VIRGINIA
Health Department (9/1/66)

WASHINGTON
Department of Ecology (9/1/66)

WEST VIRGINIA
Department of Health (6/1/66)

WISCONSIN
Department of Natural Resources (3/1/71)

WYOMING
Department of Health & Social Services (6/1/68)

GUAM
Department of Public Works (11/1/69)

PUERTO RICO
Environmental Quality Board (9/1/67)

VIRGIN ISLANDS
Office of Lieutenant Governor (7/1/71)

INTERSTATE:

DISTRICT OF COLUMBIA-MARYLAND-VIRGINIA
Metropolitan Washington Council of Governments (3/1/69)

GEORGIA-TENNESSEE
Chattanooga Area Regional Council of Governments (6/1/68)

IOWA-NEBRASKA
Omaha-Council Bluffs Metropolitan Area Planning Agency (7/1/68)

KANSAS-MISSOURI
Metropolitan Planning Commission-Kansas City Region (3/1/68)

OHIO-KENTUCKY-INDIANA
Ohio-Kentucky-Indiana Regional Planning Authority (7/1/69)

MISSOURI-ILLINOIS
East-West Gateway Coordinating Council (10/1/71)

MISSOURI-KANSAS
Mon-Kan Bi-State Planning Commission (7/1/71)

REGIONAL:

GEORGIA
Oconee Area Planning & Development Commission (7/1/71)

INDIANA
Marshall County Planning Commission (7/1/71)

MINNESOTA
Head of the Lakes Council Governments (7/1/71)

MISSOURI
Bootheel Regional Planning Commission (10/1/71)

OHIO
Board of Cuyahoga County Commissioners (8/1/71)

OREGON
Lane Council of Governments (7/1/71)
Mid-Willamette Valley Council of Governments (9/1/71)

PENNSYLVANIA
Central Pennsylvania Joint Planning Commission (9/1/71)
Turnpike District Planning & Development Commission (9/1/71)

TEXAS
North Central Texas Council of Governments (9/1/71)

WASHINGTON
County of Pierce (7/1/71)

agencies. Since solid waste planning grants were initiated, the number of State solid waste programs has increased from five to 48.

Research and Development Grants

Research and Development Grants are awarded in the areas of air pollution, pesticides, radiation, solid waste, water hygiene, and water pollution control. These can be obtained from EPA Headquarters by public or private agencies, institutions and individuals to assist in research projects relating to the causes, control and prevention of pollution that support projects directed towards the discovery and development of new information and technology in the chemical, physical, biological and sociological sciences. This includes the identifying of pollutants, the rate and persistence of pollutants, the effects of pollutants, the treatment processes, the non-treatment methods of pollution control and the ultimate disposal of pollutants.

Demonstration Grants

EPA Headquarters awards Demonstration Grants in the fields of water pollution control, air pollution and solid waste. Public or private agencies, institutions, and individuals can use these to support surveys and demonstrations of new methods related to the causes, control and prevention of pollution. They are designed to evaluate the application of research findings.

REGIONAL AND STATE PROFILES

REGION I

The States of Region I constitute two percent of the U.S.'s total area, six percent of the population, and eight percent of the manufacturing establishment.

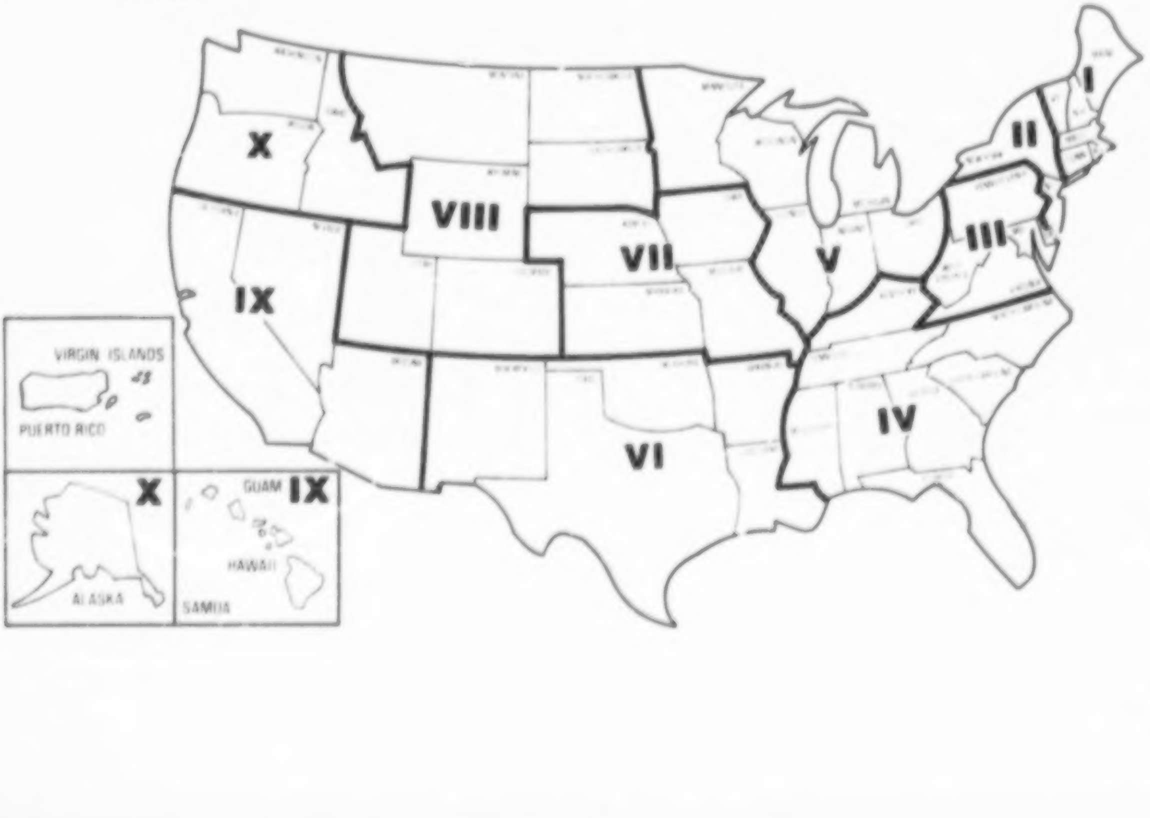
Although 25 percent of New England's population is concentrated in the Boston area, there have been some striking environmental improvements in this area. Boston Harbor, polluted by municipal sewage and industrial waste, is now the cleanest it has been in 20 years because of EPA support. Its beaches are now open for public bathing, and many of the Harbor's shellfish areas are reopened for harvesting.

An EPA grant has been given to Boston for the construction of an underground sewage retention facility to prevent polluted runoff from pouring into the Basin during periods of heavy rainfall. If this demonstration project is successful, it will be employed in other areas of the U.S.

TABLE 29.

REGIONAL OFFICES

I BOSTON
II NEW YORK
III PHILADELPHIA
IV ATLANTA
V CHICAGO
VI DALLAS
VII KANSAS CITY
VIII DENVER
IX SAN FRANCISCO
X SEATTLE



Since 1956 when the Federal Construction Grants Program was initiated, there have been 640 waste treatment facilities projects. In 1971 alone, there were 67 projects.

The EPA Water Program has 110 active research and development projects in New England. There are 11 active solid waste research and development grant awards and some air research grants. Grants have also been awarded to the States' pollution control agencies and the New England Interstate Water Pollution Control Commission.

A significant accomplishment has been the cleanup of New Hampshire's Pemigewasset River which essentially had been dead for the past 40 years. With EPA financial support, seven treatment plants were constructed on the "Pem," which has now become one of the finest trout streams in the Region.

Connecticut

Connecticut has 70 active construction projects, more than any other State in New England. In Fiscal Year 1972 alone, 25 new projects were planned with total eligible cost amounting to $96.2 million. A unique accomplishment involving Federal, State, municipal and labor union cooperation was initiated in seven Connecticut communities in the training of 40 Vietnam veterans as waste treatment plant operators, which is the first program of its kind in the country. Solid waste, pesticides and radiation programs were placed under the new Connecticut Department of Environmental Protection which began operating October 1, 1971. Radiation program responsibilities of the new Agency include medical as well as environmental aspects. The Connecticut legislature through Public Act 845 (approved July 8, 1971) enacted comprehensive solid waste management legislation. It included, among other things, a grant-in-aid program to communities for practically all types of solid waste facilities.

Maine

Maine continues to lead in the development of safeguard regulations for the control and prevention of oil pollution. New regulations were enacted which detail actions for regulation and enforcement of oil spill cleanup to public waters from any source. The Governor of Maine adopted the State solid waste plan on September 2, 1971. However, the plan which was developed under a grant from EPA needs legislative support.

Massachusetts

Massachusetts proceeded with its reorganization process combining 170 existing State agencies and assigning them to one of nine cabinet offices. The Executive Office of Environmental Affairs, one of the new cabinet offices, will combine the functions of several environmental programs including air, water, solid wastes, and pesticides under a single agency. Massachusetts passed legislation authorizing any group of 10 or more residents to sue a polluter. The statute permits action against air and water pollution as well as against excessive noise, and destruction of seashores, wetlands and historic sites. Community noise standards were developed and proposed for adoption by Boston.

Massachusetts, Vermont and New Hampshire

The three States of Massachusetts, Vermont and New Hampshire established a tri-State Radiation Surveillance Program for the Vermont Yankee Atomic Power Plant at Vernon.

New Hampshire

The New Hampshire legislature prepared legislation authorizing the creation of the Winnipesaukee River Basin Region which will join together six towns and two cities in a regional sewage and waste disposal system. Present plans call for a single, regional facility to eventually serve all of the communities. This project is a national landmark approach to the regional treatment concept. Administrator Ruckelshaus thought so highly of this project that he allocated $1 million from his discretionary anti-euthrophication program funds for the purpose of improving the efficiency of an existing primary treatment plant at Laconia which should help prevent farther euthrophication of Lake Winnisquam.

Rhode Island

Rhode Island is making progress toward municipal and industrial abatement. The Blackstone Valley Sewer District Commission has further extended its multimillion dollar interceptor system from East Providence to the Woonsocket area, thereby abating substantial industrial discharges to the Seekonk River. Geigy Chemical Corporation, one of the largest industrial dischargers in the State, is completing its 1.2 MGD treatment plant. This Cranstone, Rhode Island plant should have a marked, favorable effect on the water quality of Pawtuxet River. Rhode Island adopted legislation (Chapter 265 of the Public Laws of 1971, the Solid Waste Disposal Companies Act) to set up solid waste collection and disposal on a Statewide basis as a privately operated public utility. The legislation is controversial and did not provide for administrative capability in the Public Utility Commission.

Vermont

On July 1, 1971, the State of Vermont instituted a new permit program with temporary discharge-fee provisions. It is believed to be the first effluent charge system in the Nation. Penalties for violation of any provision of the permit act can amount to $10,000, or imprisonment of not more than five years, or both.

Vermont is also one of the first States to adopt a Statewide land use planning and control program. Planning task forces were established to implement provisions of the Act.

New England Interstate Water Pollution Control Commission (NEIWPCC)

The Commission has sponsored and developed a unique surveillance technique for determining isotherms, (lines of equal temperature) in large bodies of waters using aerial infra-red and other photographic methods. The Commission continues to operate the New England Regional Wastewater Institute, located in South Portland, Maine, which offers one-year technical courses as well as shorter one and two week specialized courses for wastewater treatment plant operators.

All States in Region I have submitted the required air quality standards and all have been approved.

REGION II

Region II embraces the most densely populated area in the U.S. Twenty-eight million people inhabit its 59,500 square miles. Despite staggering troubles of overcrowding and extensive industrialization, the staff of Region II has achieved some notable successes.

Under pressure from the EPA Regional Enforcement Division, 12 industrial firms in New York and New Jersey voluntarily imposed strict controls that restrict the discharge of toxic mercury from their plants into local waterways. Implementation plans to achieve complete elimination of mercury discharges at all 12 plants are now well underway, and abatement efforts have already reduced mercury effluent to a small fraction of their former levels.

At the same time there are many obstacles to EPA's progress. For example, the Passaic Valley Sewage Commission collects, and partially treats, wastes from 1.2 million people, 30 cities, and 1,700 industries in northern New Jersey. The Commission is able to remove only 12 percent of the waste material and is forced to discharge the rest into New York Harbor's upper bay, constituting a major source of pollution in the New York City area.

New York

A comprehensive air pollution control implementation plan has been submitted by New York. The State legislature enacted necessary legislation authorizing enforcement of the plan. Construction began on the much-needed North River sewage treatment plant in New York City. This is part of a $774 million project and the State is funding more than $57 million of that amount. A mathematical model has been developed to facilitate the assigning of sources of solid waste to disposal sites. Rules and regulations implementing the 1970 State pesticide law have been adopted, thereby enabling the State to establish a list of 72 restricted pesticides. A contract was entered into with AEC to conduct environmental surveillance around nuclear facilities. A field study of the Nation's first commercial nuclear fuel reprocessing plant has been conducted. New York State has enacted an amendment to its air pollution code to include "noise" as an air pollutant. The State is developing a State-wide noise pollution control program.

New Jersey

New Jersey has initiated a full-scale, State-operated, motor vehicle emission testing program designed to control hydrocarbon and carbon monoxide air pollutants. This program is a part of the New Jersey air pollution control implementation plan. A water quality standards revision conference for the New Jersey coastal area has been requested by the Governor. As of December 1, 1971, the State led the Nation in the total number of disposal sites meeting the criteria of the Mission 5000 Program. The New Jersey Energy Council was formed by executive order in the fall of 1971, to investigate and assess the siting and other environmental factors of existing and proposed nuclear facilities within the State.

Puerto Rico

An air pollution control implementation plan was submitted. As part of the requirements of this plan, Puerto Rico adopted its first comprehensive regulations for the control of air pollution. Puerto Rico has submitted "Regulations for the Control of Radiation" for approval by its Commission for the Control of Radiation. A strong enforcement program has been initiated for the closing down of open burning dumps or their conversion to sanitary landfills.

Virgin Islands

A comprehensive air pollution control implementation plan has been submitted. A study has been undertaken to develop a comprehensive plan for solid waste management for the Islands.

REGION III

Region III occupies only 3.4 percent of the U.S. land area, but has 11.5 percent of its population. Most of Region III's people are concentrated in the Eastern Seaboard megalopolis, where average density is 193.5 people per square mile. Manufacturing in Region III contributes 13 percent of the Nation's employment and 63 percent of the U.S. mine-pollution problem. As a result of EPA grants this year, Region III States have doubled their spending on water pollution during the last four years.

With EPA's assistance, Maryland's Environmental Service developed an environmental plan. It now bears responsibility for the operation and maintenance of some 27 state-owned sewage treatment plants and waste disposal units. The State also passed oil spill regulations and the first power plant siting act in the U.S. Heavy metals, oil, and grease contained in material dredged from Baltimore Harbor are being deposited in a diked area rather than the Chesapeake Bay.

In 1960, West Virginia's Kanawha River was practically an open sewer. The State and Federal Government began cleaning up the Kanawha, and by 1971 EPA was supervising an intensive purification program. At present there is an improvement in the river's taste, odor, oxygen content and water quality. By 1975 it should be up to normal standards.

In Pennsylvania, there was a three million gallon oil spill at Berks Associates, Inc., oil reclaiming plant. EPA contributed funds to clean up and minimize the damage and it helped to eliminate 15 million gallons of oil sludge in the Berks Company's waste lagoons.

Since thermal pollution promises to be a major problem in the future, as power demands increase, EPA has been concerned with methods of preventing or minimizing its adverse effects on the environment. In Virginia, EPA is encouraging a Virginia Institute of Marine Science study—the first of its kind—to provide the first detailed "before and after" analysis of waste heat discharges into an estuary from a nuclear power plant.

An example of the effectiveness of interstate cooperation is the agreement between the District of Columbia, Maryland and Virginia to give the Metropolitan Washington Council of Governments the responsibility for area air pollution control planning. This agreement provides a more coordinated attack on the problem, and affords the opportunity for total Federal grants which would not otherwise be available to the individual jurisdictions.

Delaware

Regulations governing drinking water standards were adopted. These regulations set chemical, bacteriological, physical, source and protection standards for all public water supplies in the State. Also, requirements for bacteriological, chemical, and physical sampling frequency and manner of sampling were set forth. The adjustment of fluoride concentration and the chlorination of all public water supplies are required. There has been one recent encouraging incident involving air enforcement. The Department of Natural Resources and Environmental Control has taken a vigorous stance against Delmarva Power and Light Company for violating a Federally approved air implementation plan with respect to the use of sulfur in fuels, has cooperated fully with EPA, and shows every indication of being a vigorous State enforcement agency. Delaware plans to have a quarterly, longitudinal study on tritium, gross alpha and beta and gross gamma. Radioactive samples have been taken from six stations on the Delaware River for study of tritium and gross gamma scans. Daily air samples are taken for gross beta count. A noise bill has been drafted and is being reviewed. A pesticide law was passed July, 1971. Present enforcement activities involve the removal of pesticides intrastate which do not meet the standards of the Act. Three open dumps were eliminated and replaced with approved disposal methods.

District of Columbia

The Eighth Planning District of Northern Virginia and the Washington Metropolitan Council of Governments developed an agreement which is intended to lead to the first attempt to develop an integrated water quality management plan for a portion of the Washington Metropolitan Area. Construction was started on the expansion and upgrading of the Blue Plains Sewage Treatment Plant in Washington, D. C. On July 27, 1971, the Department of Environmental Services was established. The new Department is the result of combining functions of the old Department of Sanitary Engineering, Environmental Health Administration, and related responsibilities of the Department of Human Resources. This new Department has responsibility for air, water and solid waste activities. Radiation Protection Standards have been drafted and are being reviewed. The actual legislation was passed in July, 1970. D.C. has scheduled and surveyed hospitals for annual inspection. There has been an intensive program mounted to collect as many radium sources as possible for shipment to the Southwestern Radiological Health Lab. Nine hundred and eighty-one environmental samples including air, water, and sewage were monitored for radioactivity. Three hazardous radium sources from the public school system in Washington, D. C., have been removed. Noise abatement regulations were drafted and sent out for review. A request for a grant for two mobile, sound monitoring stations was sent to EPA Region III. A traffic noise study was conducted to determine average noise levels at a busy intersection a hospital area and a residential area. Also, a noise study on aircraft noise from National Airport was made. Plans for an asphalt plant were disapproved due to noise level criteria in the zoning regulations.

Maryland

A mandatory certification law for all wastewater treatment facilities operators was implemented. The water supply surveillance capabilities of the Maryland Water Supply Program was improved by the addition of two permanent positions to the field investigation staff. Also, a Statewide notification procedure was established, whereby the Maryland Water Supply Program will notify the appropriate county health officers of the detection of sodium content in drinking water which may present a health hazard to those consumers on a sodium-strict diet. Maryland holds monthly "enforcement conferences" in which all parties interested in water enforcement in the State participate. Maryland's "Power Plant Siting Bill' has become effective. Monitoring equipment has been installed, and is operating around the Calvert Cliffs nuclear reactor site. Preliminary monitoring surveillance was established in the lower Susquehanna River Basin where proposed reactors are scheduled. Maryland is receiving $12,500 for three years from the Atomic Energy Commission to assist the on-site surveillance of the Calvert Cliffs nuclear reactor. Maryland is also attempting to identify tritium concentration in the lower Susquehanna and the Calvert Cliffs area. Four noise bills have been introduced. Plans have been developed to inform the public of noise effects and available means of control. The State has provided technical assistance and/or information to other State agencies, citizens groups and private citizens on specific noise problems, and noise pollution in general. State Regulation 4309 requires each county to develop plans for solid waste management. Thirty open-dumps were eliminated and replaced with acceptable disposal methods.

Pennsylvania

Tax reform and State taxation providing for tax credits in certain cases relating to the environment have been approved. The Department of Environmental Resources was established to consolidate State Environmental functions. A grant of $275,000 was awarded to the Commonwealth of Pennsylvania to develop, during an 18-month period, a water quality management plan for the Pennsylvania portion of the Lake Erie Drainage Basin. In 1971, the Pennsylvania Department of Environmental Resources beefed up its State Environmental Strike Force, consisting mainly of lawyers assisted by a few engineers. This force has been responsible for instituting numerous law suits under the Pennsylvania Clean Streams Law (150 stream miles were cleaned up), and only recently filed a multi-count suit in conjunction with the Allegheny County authorities against United States Steel's numerous plants south of Pittsburgh. The Atomic Energy Commission is providing $10,000 a year, for three years, to aid Pennsylvania in the surveillance of three nuclear power reactors within the State. In January 1972, the Motor Vehicle Noise Bill came into existence. This includes trucks, motorcycles and cars. Pennsylvania has also established procedure on handling public noise complaints (Public Health Nuisance Law). All of the 67 counties have been requested to develop and implement plans for solid waste management. During 1971, 62 counties were actively engaged in preparing county plans. Two regional planning grants have been awarded. Susquehanna Economic Development Authority is developing solid waste management plans for a 10-county region. The Pennsylvania Turnpike Development Planning Commission is developing solid waste management plans for a six county region. These grants will demonstrate the feasibility of multi-governmental bodies joining together to cope with a common problem—solid waste management. Approximately 400 violation notices were issued to landfill operators who were in non-compliance with State solid waste regulations. Legal actions were filed, and won, against 50 landfill operations for non-compliance with the court rulings in favor of the State in all 50 cases. Regional Solid Waste Management personnel conduct visits to each solid waste disposal site at least once monthly, and the results are computerized. During 1971, 41 open-dumps were eliminated and replaced with acceptable disposal methods.

Virginia

A joint resolution was adopted directing the Virginia Advisory Legislation Council to study the desirability of establishing a single, State agency to regulate and control all environmental pollution. The Virginia legislature passed a bill which transfers the Division of Water Resources from the Department of Conservation and Economic Development to the State Water Control Board. Rules and regulations for the disposal of solid waste were enacted by the State legislature effective April 1, 1971. Thirty-two open dumps were closed during 1971 and replaced with approved disposal systems. The Virginia State Water Control Board adopted a policy which reequires that water quality management plans be developed for all planning districts within the State. They further passed regulations which give the Board legal power to enforce the provisions of duly approved water quality management plans. A grant of $399,890 was awarded to develop a water quality management plan for the Lower James River Basin. A detailed study of the pollution problems of the Occoquan Creek Watershed was made and a comprehensive plan for their solution was developed. Treatment facilities to be installed in the basin will employ the latest and most advanced technology. Similar plants will be constructed by Alexandria, Arlington, Fairfax and Prince William to improve and protect the Potomac River. The Radiological Health Section of the Bureau of Industrial Hygiene has been engaged, during 1971, in the development of the regulations to implement Virginia's radiation law. The Bureau of Industrial Hygiene is working on a State plan to conform with the State of Virginia's participation with the Williams-Steiger Occupational Safety and Health Act of 1970, which will improve the coverage of occupational noise in the State. "Resolution 51" was passed by the legislature. This provided for a report submitted in December, 1971, titled "Virginia Pesticide Study and Recommendations".

West Virginia

The Ohio River Basin Commission was established January 13, 1971. The West Virginia Water Supply Program developed a 44-week training course which will be initiated in 1972 for the education of water treatment plant operators in the rural localities of the State. One hundred and six gross alpha and beta analyses on public water supply have been done. All counties were instructed to formulate county-wide plans for solid waste management. A solid waste management plan for an eight-county region was completed and implemented. During 1971, 17 open dumps were eliminated and replaced with acceptable disposal methods.

During 1971, all six States within Region III developed and submitted implementation plans in conformance with the Clean Air Act, as amended.

REGION IV

Region IV, which in recent years has had a rapid growth of population and industry, has 31.8 million people and an area of 371,000 square miles.

Atlanta, the principal polluter of Georgia's Chattahoochee River, was served with a 180-day notice on December 10, 1971, to halt violations of Federal-State water quality standards or to face the possibility of court action. As a result, Atlanta committed itself to one half the cost of the cleanup of the Chattahoochee.

In addition to the Atlanta achievement, the most dramatic EPA action has been the cleanup of the Coosa-Etowah River complex in Georgia, where the Federal enforcement conference exerted strong pressure for pollution abatement.

In Tennessee, Nashville-Davidson County was one of the first metropolitan areas in the Southeast to initiate an effective water pollution abatement program. In 1970, it began operation of an entirely new wastewater treatment facility and expanded one it had built in 1956. Presently, it is completing designs for a $21 million wastewater treatment facility with a daily capacity of 25 million gallons. Since January, 1970, Memphis began a five-year program for full secondary waste treatment, which includes interceptor sewer construction, a main pump station, and a new wastewater treatment plant.

EPA has awarded grants to Florida, South Carolina, Georgia, Tennessee, and Kentucky to set up practical solid waste programs. Orange County, Florida, will use solid refuse to provide a large housing and recreation area near Orlando. This project is expected to become a national model for solid waste disposal.

Alabama

A new air pollution law was passed, which gives the State Commission comprehensive legal authority and responsibility for controlling and preventing air pollution in the State. This Act completely replaced the Air Pollution Control Act of 1969 which was considered by the Federal Government to have inadequate legal authority to control air pollution. A new law was enacted, which established a Water Improvement Commission with professional and citizen-at-large representation. The new Commission replaces the former one that was industry-oriented. Also, the new Commission has received a considerable increase in funds (although still minimal), over that received in previous years. The Pesticide Act of 1971 for Alabama became effective January 1, 1972, as did Act #1957 which regulates custom application of pesticides. The Pesticide Act of 1971 requires certification by users prior to purchase of certain restricted pesticides. The State Matching Construction Grant Program authorized and made all projects initiated during Fiscal Year 1971 retroactive. A mandatory wastewater treatment plant operator certification program was initiated. The State Solid Waste Management Act was passed in 1969, and became fully effective on September 12, 1971. Another State law was passed, which authorizes cities and counties to form solid waste management authorities which may both establish user fees and make their services mandatory. Twenty-six county-wide solid waste collection and disposal systems have been established, eight more counties have begun implementing county-wide systems, and 17 additional counties are actively planning for county-wide collection and disposal systems. The number of sanitary landfills in Alabama was increased from less than 10 in 1967, to approximately 50 at the present.

Florida

Florida has enacted new provisions and amendments to its 1969 Air Pollution Statute which provides for establishment of a permit system and prohibition against open burning. The State passed a $100 million referendum for matching Federal waste treatment facility grants. The State is now eligible for the 55 percent grant. The State Department of Pollution Control filed a $20 million suit against a phosphate mining and processing industry for a major spill in the Peace River, and also, for the first time, cited major agricultural polluters (muck farmers) as contributors of pollution. The State has an active water quality management planning program with five active Federal grants. A mandatory treatment plant operator certification program has been initiated. Florida has completed and published a State solid waste management plan. Legislation was passed which prohibits open burning of solid waste, effective July 1, 1971. The closure, or conversion, to sanitary landfill of 7141 dumps was reported, of which 91 qualified for Mission 5000. Approximately 55 new landfill site and operational plans have been approved by the State.

Georgia

Georgia amended its 1967 Air Quality Control Act to provide for civil penalties for violators. It established a permit system and the authority to inspect pollution control devices on motor vehicles. The State legislature has, as requested by the Governor, reorganized the entire pollution control effort in the State, and has established a Department of Environmental Control patterned after EPA. The State Pollution Control Authority continues its active enforcement program. Although the legislature established a matching grants program, the stipulations put on it preclude the State from being eligible for the 55 percent Federal grant. A mandatory treatment plant operator certification program has been initiated. The State Board of Health adopted rules and regulations for solid waste collection and disposal. The Solid Waste Management Act was passed by the State legislature. A Constitutional amendment was passed by the State legislature allowing cities and counties to establish solid waste management districts which must now be approved by the voters. State government reorganization placed the solid waste agency in the Environmental Protection Division, Department of Natural Resources. The State solid waste management plan was completed and published, accepted by EPA, and adopted by the Governor of Georgia. Enforcement actions have been instituted and, to date, 22 cease and desist orders have been issued and one injunction has been brought; acceptable disposal sites have increased from two percent to 20 percent. A survey of solid waste management in nursing homes was completed, and a survey of industrial solid waste management was begun. Nine solid waste management training courses have been held throughout the State. An on-site landfill operator training course was set up and is being implemented.

Kentucky

The legislature recently passed legislation which created a new Department of Environmental Protection which provides more enforcement authority to the State Pollution Control Agency. The legislature has also doubled the funds for pollution control and is in the process of voting on a matching grants program. The solid waste agency was elevated to division status in the Health Department; recent legislation will move it to a new Department of the Environment. The State solid waste management plan has been completed and published, accepted by EPA, and adopted by the Governor of Kentucky. Enforcement actions have been initiated, 25 informal and five formal hearings have been held, with four convictions resulting from the formal hearings. Ninety-eight dumps were reported closed, of which 46 qualified for Mission 5000. One hundred-ten permits for sanitary landfills have been issued. A survey of industrial solid waste management was started.

Mississippi

The State established a matching grants program for waste treatment facilities, making them eligible for the 55 percent Federal grant. A bill was passed in the State legislature allowing counties to establish solid waste management districts. Standards and guidelines for sanitary landfills were adopted. The State solid waste management plan was completed and published, accepted by EPA, and adopted by the Governor of Mississippi. County-wide solid waste management plans were prepared for 15 counties. Sixteen municipal dumps were converted to sanitary landfills. Storage and collection practices were improved in 17 cities. Air pollution from the open burning of solid waste was abated or eliminated at over 200 municipal dumps. Potential water pollution problems were abated or eliminated at 16 dumps.

North Carolina

North Carolina has amended its Air Act to include limitations on open burning, as well as emission limits on fuel burning equipment. The State upgraded classification for all its major streams to Fish and Aquatic Life. The North Carolina Pesticide Law of 1971 was enacted and became effective January 1, 1972. The law covers the use of certain pesticides and requires permits for restricted products. A Regional Sewage Disposal Planning Act was passed. The North Carolina Clean Water Bond Act was passed. A Constitutional Amendment termed "Environmental Bill of Rights" was passed, and is to be voted on at the next General Election. The North Carolina Environmental Policy Act of 1971, passed, effective October 1, 1971–September 1, 1973. A solid waste management act was passed by the State legislature rules and regulations for solid waste management were adopted. Forty-five dumps were reported closed or converted to sanitary landfills, 35 of which qualified for Mission 5000. Basic county-wide solid waste management plans were developed for over 90 (90) of the State's 100 (100) counties.

South Carolina

The State is presently upgrading the classification of over 200 streams. The legislature has significantly increased the Pollution Control Authority's staff and budget. The State Matching Construction Grant Program Act was passed by the Senate, and is expected to be passed by the House. The State solid waste management plan was completed and published, accepted by EPA, and adopted by the Governor of South Carolina. Rules and regulations for solid waste management have been separately developed and adopted by the State Board of Health and the Pollution Control Agency's solid waste programs. Thirty-nine dumps were reported closed or converted to sanitary landfills, of which 36 qualified for Mission 5000. A on-site landfill operator training course was set up and is being implemented.

Tennessee

A new water pollution control law with provisions for matching wastewater treatment facilities grants and stronger enforcement was enacted. The legislature has doubled the budget and staff of the Pollution Control Agency. A new strip mining law was passed by the legislature and is awaiting approval by the Governor. A State solid waste act was passed. Legislation was passed establishing a State grant program to financially assist local governments in the operation of approved disposal operations. A training program for waste disposal operators and managers of waste disposal systems was developed and is being implemented. Ten registered disposal operations have been approved. A survey of industrial solid waste management was begun.

REGION V

Region V, encompasses 325,000 square miles, has a population of 43.6 million, about 20 percent of the total U.S. population, and accounts for about a third of the gross national product. Manufacturing activity in the area represents a third of the national total.

Region V contains portions of four of the five Great Lakes (Superior, Michigan, Huron, Erie). Lake Erie is the most notorious example of pollution; a body of water "dying" as a direct result of high population density and industrial concentration. But Erie is only the most obvious case of neglect. Thousands of smaller lakes in Region V suffer from eutrophication or "premature aging", a condition resulting largely from untreated phosphorous wastes.

Encouragingly, some of the Nation's most original and effective anti-pollution actions have been taken in the Great Lakes area, and Region V is one of the most active Federal jurisdictions in the battle against environmental degradation.

The Detroit-Cleveland area, reacting to EPA's initial onslaught, has instituted a cleanup campaign. By the end of the present decade, Lake Erie is expected to be well on its way toward recovery.

Although seven of the Nation's 20 operable nuclear power reactors are located in Region V, they are expected to increase to 11 of 29 national reactors by the end of 1971, and 27 of 97 national reactors by the end of 1976. EPA has lent significant impetus to an encouraging trend toward the construction of cooling towers in connection with reactor thermal discharges.

Indiana was the first to ban discharge of nearly all phosphates into lakes and streams. A fine of $1,000 can be imposed on any firm discharging detergents with a phosphate content of more than 12 percent, a proportion far below that of most commercial cleansing preparations.

With the encouragement of EPA, the Minnesota Pollution Control Agency has adopted animal feed lot regulations applying to 15,000 operators. The rules require drainage from outdoor feed lots to be trapped by dikes, thereby preventing uncontrolled runoff into streams and lakes.

One of the major tools for encouraging cleanup of water pollution in Region V has been the water quality standards violation notice (180-day notice). Forty-six of the 57 notices that have been issued by EPA have been issued in Region V.

Fast, effective response to oil spills has been developed by Region V in cooperation with other Federal and State agencies. A spill of 200,000 gallons of oil in Saginaw Bay in October, 1971, was quickly cleaned up through on-the-scene efforts supported by EPA. EPA efforts were the primary force behind removal of 550,000 gallons of fuel oil from a stranded freighter in Lake Huron, after fears were expressed the oil would spill out and pollute nearby beaches.

EPA also took steps following complaints from citizens to install sophisticated air pollution monitoring equipment on Chicago's South Side to determine the impact of steel plant pollution on neighborhood residents.

Illinois

Illinois implemented a source-oriented environmental radiation surveillance program for its nuclear power stations. It recognized the need to adequately staff its water quality management functions and has taken positive steps to do so. A series of 10 public hearings have been authorized by the Illinois Pollution Control Board to regulate the application of fertilizers and animal manure on farms to reduce input of nutrients to Illinois waters. Some 17 plan reviews and performance specifications of Federal installation waste treatment facility projects were performed, and environmental impact statements on 43 highways and two bridges were filed for review and comment. The Illinois Pollution Control Board, with assistance from the State Environmental Protection Agency and the Attorney General's Office, has conducted approximately 500 hearings on varied pollution matters. In addition to adopted effluent standards, the board has also adopted, upgraded and revised water quality standards for all the waters of the State. An air implementation plan has been submitted for the purpose of carrying out the requirements of the Clean Air Act, and emission regulations have been adopted which will hopefully achieve primary ambient air quality standards.

Indiana

Comprehensive radiation protection regulations were adopted by the State Board of Health, with standards for radioactive waste discharge limits compatible to Atomic Energy Commission regulations. A pesticide model use and application act, which regulates the distribution, sale, and use of pesticides and provides for the appointment of a Pesticide Review Board was passed. Indiana has agreed to increase its staffing of the air pollution control program. A one plan review and performance specification of a Federal installation waste treatment facility project was performed, and environmental impact statements on 17 highways were filed for review and comment. The State has agreed to a comprehensive study of environmental pollution control authorities and organizational structure and program resource needs, by an independent study organization, which will be financed by EPA. In 1971, 55 enforcement actions were initiated and 15 actions were referred to the Attorney General for enforcement by the Indiana Stream Pollution Control Board, the State's pollution control agency. The State has added to its water pollution abatement programs by the adoption of revised water quality standards for the waters of Lake Michigan and the Calumet River and the proposal of a revised implementation plan to meet the revised standards adopted in 1970. The State has also adopted standards designed to protect natural spawning areas, rearing or imprinting areas and migration routes of Salmonoid fishes. Indiana has submitted an implementation plan to carry out the requirements of the Clean Air Act. It has also passed legislation broadening the powers of the State agency to carry out air pollution control programs, and it has adopted emission regulations which will hopefully achieve primary ambient air quality standards.

Michigan

A contract was negotiated with the Department of Public Health to provide data in support of the National Environmental Radiation Monitoring Program. A stringent solid waste law was adopted in 1971. The Michigan Insecticide, Fungicide and Rodenticide Act of 1949 was amended to control restricted use of pesticides. An active and forceable position was taken with regard to water pollution control activities in the critical southeast Michigan area which encompasses Detroit and environs; an improved working relationship with local governments has been established. Some 17 plan reviews and performance specifications of Federal installation waste treatment facility projects were performed, and environmental impact statements on 20 highways and one bridge were filed for review and comment. The Michigan Water Resources Commission, the State's pollution control agency, issued 63 Final Orders of Determination against, and entered into 36 stipulations (voluntary agreements) with, municipalities and industries responsible for causing pollution. A successful watercraft pollution control compliance inspection and enforcement program was initiated by the combined efforts of county sheriffs, marine deputies, conservation officers, and the staff of the MWRC. The purpose of this program is to assure that all toilet-equipped recreational and commercial watercraft are equipped with either a holding tank or an incinerating device. The MWRC has also adopted revised temperature criteria for all of the waters of the State. Public Act 200 was passed which requires wastewater discharges to pay annual surveillance fees for increased State monitoring of the streams, and to list each year the toxic and critical materials that the company uses or produces in its operations. The State has submitted its implementation plan for the purpose of carrying out the requirements of the Clean Air Act.

Minnesota

Significant modifications in off-site environmental radiation surveillance networks were made. An agreement was executed with a nuclear power company to perform on-site surveillance. Legislation was enacted pertaining to dispoal of junk cars and wastes from cattle feed lots, as well as an increase in appropriations to strengthen the solid waste program. The Minnesota Economic Poisons and Device Law and the Minnesota Spraying and Dusting Law were amended. The Economic Poisons Law changed the registration fee for products; it now requires dealers to obtain a calendar-year license, changes expiration date of registration from June 30 to January 1, each year, and adds a new section for the handling, discarding, storing and displaying of pesticides. The Spraying and Dusting Law requires licensing of aerial applicators; licensing of applicators who apply pesticides to public waters to pass Federal examinations; identification cards to be carried by all licensed applicators; makes it unlawful to misrepresent the effect of methods and materials used; authorizes the Commissioner to inspect equipment and set standards for operational use, permits filing of damage claims arising from application of pesticides; provides nonresident applicators to appoint Commissioner of Agriculture as their agent, upon whom all legal processes may be served; makes it unlawful for licensee to permit judgment to remain unsatisfied for more than 30 days; grants the Commissioner authority to enter public or private premises for necessary inspections; broadens enforcement procedures including assistance from the County Attorney or Attorney General; authorizes the Commissioner to enter into cooperative agreements with any Federal, State, or local governmental units; and authorizes the Commissioner, after notice and a hearing, to deny, suspend or revoke a license. Minnesota enacted its State Matching Grants Program for sewage treatment works construction. Some six plan reviews and performance specifications of Federal installation waste treatment facility projects were performed, and environmental impact statements on 11 highways and three bridges were filed for review and comment. Enforcement actions include the continuing suit of Reserve Mining Company and Northern States Power Company's Nuclear Plant at Monticello. The State has also filed suit against the City of Bemidji and is continuing negotiations with the Western Lake Superior Sanitary District. Minnesota's Pollution Control Agency previously adopted water quality and effluent standards which provided a high degree of protection for the waters of the State. The State has submitted an implementation plan to carry out the requirements of the Clean Air Act.

Ohio

Ohio's Health Department purchased more than $50,000 of laboratory equipment as a first phase of expanding its environmental surveillance program. The Governor adopted the completed Statewide solid waste plan. The legislature and Governor's Office recognized the deficiency in the State environmental programs, and initiated actions toward enactment of legislation to consolidate its programs into a single agency. The State took a step forward in air pollution control by adopting comprehensive emission regulations. Some six plan reviews and performance specifications of Federal installation waste treatment facility projects were performed, and environmental impact statements on 28 highways and one bridge were filed for review and comment. The State has agreed to the performance of a comprehensive study, by an independent study firm, of the organizational structuring and manpower planning for an integrated State agency, which will have responsibility for environmental protection activities related to air, water and solid waste pollution problems. This is the first study of this scope to be sponsored by EPA. Value of the contract being negotiated with Stanford Research Institute is anticipated to be $52,000. The study began in January, 1972. A suit was filed in the Cuyahoga County Court of Common Pleas against the City of Cleveland by the Water Pollution Control Board. Up to this time, the OWPCB did not involve itself extensively with large metropolitan areas in Ohio. In addition, legislative action is pending which would consolidate pollution abatement efforts in the State by the creation of a new agency. The State is moving forward in an attempt to develop revised standards which would be Federally approvable. In addition, it is developing effluent standards and a uniform effluent reporting system. The State has begun a very active air pollution control program. Legislation has been passed which broadens the powers of the State agency to carry out air pollution control programs; emission regulations have been adopted which will hopefully achieve primary ambient air quality standards; and an implementation plan has been submitted for the purpose of carrying out the requirements of the Clean Air Act.

Wisconsin

Modifications were made in surveillance networks and surveillance data submitted was updated in support of the National Environmental Radiation Monitoring Program. Wisconsin initiated the development of a Statewide solid waste management plan with the aid of an EPA planning grant. The legislature also adopted a solid waste management enabling act. Public hearings were initiated with regard to the development of proposed animal waste control regulations. Some seven plan reviews and performance specifications of Federal installation waste treatment facility projects were performed, and environmental impact statements on 32 highways and two bridges were filed for review and comment. The State's pollution control agency, the Department of Natural Resources, has adopted revised temperature standards for Lake Michigan waters. In addition, the State submitted an implementation plan for the purpose of carrying out the requirements of the Clean Air Act.

REGION VI

Region VI, the third largest Region, has an area of 550,000 square miles and a population of 20.3 million. Statistically, more than 60 percent of Region VI's population is concentrated in 37 standard metropolitan areas that usually coincide with the area's major industrial complexes and ecological problems. Region VI leads the Nation in mineral production, which includes petroleum, natural gas, natural gas liquids, cement, sulphur, stone, bauxite, sand and gravel, molybdenum, potassium salts and copper, and produces some 75 percent of the Nation's rice.

As a result of an EPA-initiated conference to avoid widespread use of the persistent pesticide, toxaphene, which had polluted Lake Meredith, a major water supply source for 11 Texas cities, the U.S. Department of Agriculture withdrew its support of this poison. Texas outlawed its use, and New Mexico abandoned its backing of a program to use toxaphene against range caterpillars on two million acres of pastureland in the Canadian River Basin.

The American Smelting & Refining Company at El Paso has installed a pilot plant operation for removing sulful oxide from smelting operations and producing elemental sulfur which does not create the problems for the environment that conventional conversion to sulfuric acid would.

Following a seminar in January 1971, attended by more than 500 consulting engineers, State and local officials, a broad application of advanced waste treatment technology began in the Region. At the end of 1971, most new wastewater treatment plant construction projects involved some degree of new technology.

Arkansas

The enactment of comprehensive solid waste management legislation and adoption of a state solid waste plan were two major milestones. The air pollution control implementation plan was completed by the Arkansas Department of Pollution Control and Ecology (ADPCE). The State more than doubled its air sampling network with the addition of six communities. Arkansas enacted legislation which permits state financing assistance (with pay back feature) of 25 percent to communities for the construction of wastewater treatment facilities. Eleven new wastewater treatment facility projects were approved for construction at a total cost of over $3.5 million. The ADPCE adopted water quality standards for intrastate streams and completed a stream survey of the White River Basin. A grant for $85,930 was awarded to the Northwest Arkansas Regional Planning Commission to develop a basin plan for the Upper White River Basin.

Louisiana

Sixteen open dumps serving 765,000 persons were converted to sanitary landfills. Louisiana completed its air pollution control implementation plan and modified laws and regulations regarding air pollution control in 1971. A statewide air sampling network was established, and a major study of cotton gin operations was initiated. The Louisiana legislature created the Joint Legislative Committee on Environmental Quality in order to develop a management and resources development program for the Atchafalaya River Basin (Wetlands Project). Louisiana enacted legislation which permits state financial assistance (with pay back feature) of 25 percent to communities for the construction of wastewater treatment facilities. Six new wastewater treatment facility projects were approved for construction at a total cost of over $17.3 million. The State also adopted water quality standards for intrastate streams.

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High School students testing water in Fort Smith, Arkansas.

New Mexico

New Mexico established the Environmental Improvement Agency in 1971. A study of solid waste problems associated with recreational areas and the Albuquerque Solid Waste Study were completed. Under the State Solid Waste Program, an aggressive program is being pursued in the development and operation of a recycling system involving abandoned cars. The State completed its air pollution control implementation plan, developed an adequate air monitoring network, completed a comprehensive emission inventory, established an industrial source sampling team, developed air enforcement policies and guidelines, filed three lawsuits for abatement of air pollution and eliminated open burning in 20 cities. Nine new wastewater treatment facilities were approved for construction at a total cost of $5.2 million. New Mexico was the first State in Region VI that approved a direct State grant assistance program for the construction of municipal wastewater treatment facilities. It developed a model ordinance regulating the discharge of industrial wastes into municipal systems. The State Planning Office of New Mexico has opposed construction of the Tucson Gas and Electric transmission line from San Juan, New Mexico, to Tucson, Arizona, due to potential esthetic damage to the environment.

Oklahoma

Oklahoma initiated a statewide training program to help local communities solve their solid waste problems. The State completed its air pollution control implementation plan and modified laws and regulations for air pollution control. The State Health Department's Division of Air Pollution Control added a laboratory facility and expanded its statewide air sampling network. Oklahoma enacted legislation which permits State financial assistance (with pay back feature) of 25 percent to communities for the construction of wastewater treatment facilities. The State also adopted water quality standards for intrastate streams, and provided laboratory facilities to local health departments for stream and effluent monitoring. Twenty-seven new wastewater treatment facility projects were approved for construction at a cost of over $28.0 million.

Texas

The first solid waste planning grant in Region VI was awarded to the North Central Texas Council of Governments. The two-year project covers 11 counties. The State Health Department established municipal solid waste rules, standards and regulations. The State is participating in the Corpus Christi Area Oil Spill Control Association by contributing resources to the two-year study. Texas completed its air pollution control implementation plan. The Texas Air Control Board increased its staff and capabilities, completed 30-day

Recreational development of Lake Travis, Texas. Documerica Photo

air pollution surveys in all major cities and along the Houston ship channel, and added a complete central laboratory and two mobile laboratories. Texas enacted legislation to provide 25 percent State matching funds (with pay back feature) for the construction of wastewater treatment facilities, and the Texas Water Quality Board (TWQB) certified 89 new projects at a cost of over $91.6 million. A model ordinance regulating the discharge of industrial waste into municipal systems was prepared by the TWQB. Legislation was also passed which requires all municipalities with populations over 5,000 to establish water pollution abatement programs and enact and enforce regulations to control the discharge and character of wastes into municipal sewerage systems. A grant for $321,650 was awarded to the Trinity River Authority to develop a basin plan for the Trinity River.

REGION VII

Region VII comprises an area of 285,467 square miles and has a population of 10.7 million. Most of its environmental problems derive principally from agriculture, such as cattle feedlot runoff, meat and sugar beat processing wastes and fertilizer drainage.

EPA has completed many projects begun under the Federal Water Quality Act for research, development, and demonstration of methods for treating waste water carrying agricultural and food processing wastes. Region VII has had 1,623 projects for the construction of wastewater treatment facilities and interceptor sewers receiving EPA support.

A portion of the projects in the Missouri Basin Region completed by Region VII are as follows:

1. Led local, industrial and regional groups in aiding the development of a water quality management system for the Lake of the Ozarks.
2. Developed an implementation schedule calling for secondary treatment of municipal wastes at all cities along the Mississippi and Missouri Rivers.
3. Placed industrial districts in Kansas City on 180-day notice to act on interstate pollution of Missouri River, cleanup measures for gross air pollution and development of a solid waste and sanitary landfill management plan for Kansas City.
4. Prepared a guide providing comprehensive technical support for a policy of secondary treatment for waste discharges into the Missouri River.
5. Completed a demonstration grant to Grand Forks, North Dakota, to develop technology needed for the treatment of potato processing wastes, to Union Stockyards at Fargo, North Dakota, for treatment of cattle transport wastes and to Pratt, Kansas, for design of feedlots to prevent drainage.
6. Gave funds for construction of a primary waste treatment plants to reduce discharge in the Missouri River.
7. Helped St. Charles, Missouri, build primary and secondary treatment plants to reduce discharge in the Mississippi.
8. Awarded grants to St. Louis to build a two-plant sewer system and pumping station for primary waste treatment.

All Region VII States are committed to secondary treatment of wastes by 1975.

Iowa

Iowa completed a study of runoff sediment and associated chemicals from farmlands and demonstrated efficacy of soil conservation practices as a means of control and abatement of water pollution. The State legislature enacted a Conservancy Act which provides a structure for administering a control program for farm pollution and established a Chemical Technology Review Board, primarily to manage the usage of chemical pesticides. The Water Pollution Control Commission has exercised tight control over operations of wastewater treatment, citing several negligent operators and referring cases to the State Attorney General for legal action; at the same time, an outstanding program has been undertaken to train operators at Kirkwood College in Cedar Rapids. The legislature passed enabling bills for Statewide management of solid waste; the Des Moines metropolitan area has established a regional solid waste agency, which is expertly managed and serving as a national demonstration. All major sources of air pollution in metropolitan areas are on rigid compliance schedules. As might be expected, citizen environmental groups are exerting considerable pressure; they are centrally organized through the Confederation of Environmental Organizations at Ames.

Nebraska

Legislation has established a Department of Environmental Control, with authority over air, water and solid waste management. The Legislature also made a direct appropriation to initiate the State matching program for municipal wastewater treatment. Of considerable interest is the establishment, by legislation, of 24 Natural Resource Districts which will exercise some authority over pollution control, primarily that from agriculture. Nebraska has undertaken an extensive pre-operational survey of the Missouri River in connection with the anticipated 1972 start-up of two nuclear power plants—adjacent States of Iowa and Missouri are cooperating; post-operational surveys are planned. Considerable research in cattle feedlot waste control is underway, with the development of engineering technology; an excellent cooperative program prevails with the feeding industry and local government, as well as the State and Federal agencies participating.

Kansas

The State is the first to develop a fully implemented waste control program for all concentrated animal-feeding operations; also it is first to complete interim basin planning for water quality. Legislative action in 1971 established a solid waste management plan and regulation of pesticides usage. The State Health Board adopted air pollution regulations and made disinfection of municipal and selected industrial water-borne wastes mandatory. Research was pursued which demonstrated the effective use of lime in bio-treatment processes for reduction of phosphates in wastewater.

Missouri

The citizens of the State voted overwhelmingly in favor of $150,000,000 of bonds to provide the State's share of municipal wastewater treatment facilities. Legislation banning the discharge of waste from watercraft into the intra-State waters was passed—a matter of considerable importance in the heavily used lakes of southern Missouri. The State agency initiated a special program for heavy metal monitoring in critical areas. It also adopted a plan of action for dealing with emergency situations. The Air Pollution Control Commission secured a compliance schedule from Union Electric at St. Louis on particulates and sulphur dioxide emissions; limits imposed are more stringent than existing Federal standards. Research was completed at the St. Louis wastewater plant, which resulted in advanced odor control techniques. The Midwest Research Institute at Kansas City developed futuristic technology to manage concentrated animal wastes.

REGION VIII

Region VIII is comprised of more than 575,000 square miles and populated by a total of only 5.6 million people. The second largest of EPA's Regions, it occupies more than 16 percent of the Nation's total land area, but is the most sparsely populated territory in the U.S.

The Region's environmental problems are associated chiefly with the extraction and processing of natural resources, agricultural activities and population density. The latter is concentrated in Denver and Salt Lake City. Solutions to the Region's environmental problems are complicated by a water shortage.

EPA developed a plan for handling anticipated waste loads for a recreation center in Summit County, Colorado. The Agency aided in the construction of a 100,000 gallons-a-day advanced waste treatment plant, and is helping to add a process for more complete removal of solids, organics and phosphates.

EPA's Southwestern Radiological Health Laboratory closely coordinates its efforts with the State of Utah's radiation surveillance program, which includes studies of thyroid abnormalities, congenital defects, and cancer. EPA is supporting a radiation ecology study at the University of Utah and operates a mobile radiation scanning unit throughout the Region.

EPA and the National Park Service are jointly developing a water quality management plan for Yellowstone National Park. EPA is also presently evaluating Wyoming's drinking water supply.

EPA has been working with the U.S. Department of the Interior in developing environmental protection clauses in the contracts for power plant development in the Four Corners area of Colorado, New Mexico, Arizona and Utah.

EPA is actively involved in the Western U.S. Water Plan Study, which embraces the full range of water resources and pollution problems. Under EPA's Permit Program, 90-95 percent of industries and others affected in the Region have complied with the Federal requirements and have submitted their applications.

The Regional Office has had success in influencing other Federal agencies to become more environmentally conscious. For example, there has been cooperation between EPA, Utah and Hill Air Force Base concerning a new location for a fire rescue exercise.

Colorado

Colorado established a State matching grant program to assist communities constructing wastewater treatment facilities and a training program for operators of wastewater treatment plants. The Denver Regional Council of Governments received a $200,000 grant from EPA to develop a water quality management plan for the Denver metropolitan area. A low speed terminal was obtained for use of the STORET program. Mechanisms were established to deal with problems attendant to noise pollution.

Montana

Montana is considering creating mechanisms to deal with noise pollution problems. The legislature created an Environmental Quality Council with powers to hold hearings, develop policy and review projects. It created a Department of Natural Resources by consolidating existing resource functions into one agency. A previously authorized state matching grant program for construction of municipal wastewater treatment facilities was funded. Air quality standards and emission standards applicable to the non-ferrous metals industry were adopted, and a pesticides use and application law was passed which is scheduled to be implemented in 1972. Also passed were an Insecticide, Fungicide and Rodenticide Act and a Food, Drug and Cosmetic Act. The Executive Reorganization Act consolidated a number of environmental programs into one agency within the Department of Health, and also consolidated or eliminated a number of boards, commissions and other similar bodies.

North Dakota

North Dakota's legislature approved legislation requiring mandatory certification of water and wastewater treatment plant operators and approved legislation controlling water well construction and well pump installation, as well as legislation providing controls for noise pollution. A State loan program was established to assist municipalities constructing wastewater treatment facilities, air pollution control regulations were revised and a permit system was adopted to control the construction and operation of state treatment facilities. Mechanisms were established to deal with noise pollution problems, and it is now mandatory that a qualification and competence test be passed in order to be licensed as an aerial applicator.

South Dakota

Air pollution control regulations were adopted in South Dakota, including air quality standards, a construction and operation permits system, regulation of open burning, fuel consumption and incineration and industrial processes. In addition, regulations were adopted for controlling pollution from feedlot operations. The legislature authorized a State matching grant program for construction of water pollution control facilities and approved legislation regulating surface mining by, among other things, requiring reclamation of affected land and providing for penalties for violation of the act. The Black Hills Conservancy District has been awarded a comprehensive water quality management planning grant. A low speed terminal was obtained for use of the STORET program.

Utah

Utah received a comprehensive basin planning grant for the Jordan River-Utah Lake hydrologic area. Regulations for control of particulate matter from process sources and ambient air quality standards were adopted.

Wyoming

Wyoming's air pollution control budget was nearly doubled, and the Wyoming Water Plan was completed for three of the four major basins in the State. Five training courses for wastewater treatment plant operators were conducted, and approximately 50 operators completed the course work. These operators are being tested under Wyoming's new voluntary certification program. Finally, several major industrial sources were brought into compliance with air quality standards and 14 towns abandoned dump burning in favor of sanitary landfills.

REGION IX

Region IX's total land area is 389,854 square miles and its population is almost 23 million. More than half of the population is concentrated in the Los Angeles-San Diego and San Francisco Bay locales.

Like Region VIII, Region IX has a climate that can be generally described as semi-arid. In addition, its varied rugged topography causes several serious, localized air pollution problems where physical features contribute to the creation of atmospheric inversions.

EPA has been more concerned, however, with the Region's water pollution difficulties, leaving the leadership of the air clean-up to those State and local groups that had been battling for pure air long before EPA arrived on the scene. Consequently, it has concentrated its major efforts in five areas, the San Francisco Bay and Delta, the Lower Colorado River, the Southern California Coast, the Island of Oahu and the Lake Tahoe Basin.

An enforcement conference held in Honolulu resulted in a three-year plan for the cleanup of Pearl Harbor.

EPA has helped support a study for the control of water pollution in California. It has mounted a massive campaign against California's water polluters and has demanded that San Francisco clean up all sewage discharged into its Bay.

Concern about increasing nutrients from wastes dumped by recreation-seekers into Lake Tahoe resulted in an enforcement conference in 1966 and the setting of a time schedule for the removal of all sewage from the Tahoe Basin. EPA has been giving technical assistance in developing plans for controlling the Tahoe environment.

Because of the Region's arid nature, EPA's initial wastewater reclamation research efforts took place in there. This accounts for 50 percent of all wastewater reclamation in the U.S.

Arizona

Arizona has submitted an air quality standards implementation plan which is now under review. The State has also completed an interim basin plan for water quality management planning.

California

California has submitted an air implementation plan which is currently under review. Significantly, California has a law equivalent to NEPA, requiring environmental impact statements on State-funded projects. This program is administered through the Lieutenant Governor's office. California has been very active in regional planning: it has created a comprehensive regional agency to design and manage the Bay Area's sewerage system; two California COG's (the Association of Monterey Bay Area Governments and the Santa Ana Watershed Planning Agency) have received hefty planning grants ($868,000 and $630,000, respectively) for studies; and the State established a pilot project to develop procedures for a statewide total environmental monitoring program. California has also been a leader in water pollution control, taking action which made possible the approval of the State-Federal water quality standards for California, adopting a thermal-pollution control policy, and implementing a $200 million clean water bond to provide State matching funds for wastewater facilities. California has also tightened controls on: the use of pesticides, particularly DDT; the storage, transfer, and disposal of hazardous materials; and airport noise. It has submitted interim basin plans.

Guam

Guam has developed and submitted an air implementation plan, which is under review. It has also submitted interim basin plans.

Hawaii

Hawaii has submitted an air implementation plan which is being reviewed. It has also submitted interim basin plans. Hawaii is also taking part in the model state program for comprehensive environmental quality control. This is, in part, a spin-off from the Pearl Harbor Enforcement Conference. Honolulu has published a solid waste management plan.

Nevada

Nevada has submitted an air implementation plan, currently undergoing review. It has also established a Commission of Environmental Protection-to coordinate all State environmental programs.

Samoa

Samoa has developed and submitted an air implementation plan which is now under review.

Documerica Photo

Aerial view of Urban Development in Phoenix, Arizona.

REGION X

Region X, where 83 percent of its 835,000 square miles of much unspoiled wilderness is owned by the Federal Government, has a total population of 6.4 million people, extensive natural resources in the form of forests, farmlands and hydroelectric power and a wealth of clean and unexploited land, air and water.

There are 43 pulp and paper mills in the Region which are a major source of both air and water pollution.

Pollution in Oregon's Willamette River was a serious problem for 40 years. The turning point came with the establishment of Federally-approved State of Oregon water quality standards and implementation plans, combined with passage of tough State pollution control legislation and the crackdown on polluters by the State of Oregon, backed by firm Federal posture. Now, all five pulp mills have installed primary treatment facilities and four of the five no longer discharge sulfite cooking liquids into the river. The fifth mill will complete its process conversion and cease discharges in 1972. The Willamette is now safe for swimming.

Eight pulp mills have polluted Puget Sound for years. After Federal-State enforcement conference meetings in 1962 and 1967, most agreed to treat their effluent, but on delayed schedules. Presently, EPA is pursuing an aggressive program to assure Puget Sound pulp mill cleanup.

Region X's "Industrial Waste Guide on Logging Practices" is an example of EPA's major role in setting standards to protect the environment—in this case, standards of performance in forest land use management. EPA aggressively urges the Federal forest management agencies to require proper logging practices not only to protect the environment in Federal forests, but also as the good example to private forest land owners.

EPA has played a leading role in facing up to the threat of thermal pollution. It requires that off-stream cooling facilities are necessary at any new thermal (nuclear) powerplant located on inland waters or estuaries.

An EPA representative is assigned to the technical advisory board formed to review data concerning the trans-Alaska pipeline proposal and participates in making recommendations to the Secretary of the Interior. Through this arrangement, EPA is involved in impacting problems involving the classical confrontation between wilderness protection and economic development.

Alaska

In 1971 the State legislature established a Department of Environmental Conservation in a reorganization and strengthening of environmental programs and resources. EPA funds assisted with the development of a State solid waste management plan, a State survey and evaluation of solid waste needs of Kenai Peninsula and a local proposal for waste management plan for Greater Anchorage Borough. The State established an air pollution control program; adopted revised water quality standards approved by EPA; and initiated significant effort towards the State waste discharge permit plan. Mission 5000 courses were held in Anchorage, Fairbanks and Juneau.

Idaho

The State legislature approved significant amendments to the Idaho Air Pollution Code, adopted a 25 percent construction grant matching program, amended its Solid Waste Management Act, expanded a solid waste program from sites to solid waste management system, and reorganized environmental activities in the new Environmental Improvement Division under the Department of Health. Other State actions included a notification program for closing dumps polluting water, six dumps were closed or converted to landfills; participated in EPA funding to collect data on industrial wastes throughout the State; initiated industrial waste discharger program; adopted kraft pulp mill emission regulations and established compliance schedule; established training school for new persons entering the wastewater treatment plant operator field, and passed stronger pesticide legislation including licensing of government agencies and pesticide dealers.

Oregon

The Oregon Nuclear and Thermal Energy Council was created with responsibilities in regulations and power plant site certification. The Radiation Control Program was realigned and the surveillance program was enlarged for pre-operational monitoring of the Trojan Nuclear Power Plant area. The State adopted the first sulfite pulp mill emission regulation in the Nation, as well as adopting a Statewide secondary treatment requirement for industrial wastes in all waters (including coastal). It also adopted enabling legislation allowing removal of exemptions for forest slash disposal and agricultural field burning. In addition, voters approved a one million dollar bond issue; $80 million for sewage works treatment construction, and $20 million for solid wastes, sewage and planning. Regulations and licensing of pesticide disposal sites were approved, and the State enforced the discontinuance of sales of DDT in Oregon. Authority and responsibility for solid waste management was transferred from the Department of Health Services to the Department of Environmental Quality. The State has closed or converted 15 dumps to landfills. Training opportunities were established for treatment plant operators and the Mission 5000 course was also offered.

Washington

The State reorganized the Department of Ecology along functional lines and added the Shoreline Management Act, the Environmental Policy Act, and the Oil Pollution Act to its environmental legislation. The State Solid Waste Management Plan, assisted by EPA funding, was completed and approved. In addition, 14 regional-local solid waste management plans were completed via $269,000 in the 1970–1971 State budget. Twenty-two dumps were closed or converted to landfills. The Pesticides Control Act was passed, including application tests and applicator licensing. Pesticide containers were also monitored for amount and composition of residue. Enabling legislation removed exemptions for agricultural field burning and forest slash disposal. The Radiation Control Program submitted an EPA contract proposal to provide surveillance at AEC Hanford works and Trojan Nuclear Power Plant. The Thermal Power Plant Site Evaluation Council prepared for the 1972 public hearings on certification of the Hanford #2 nuclear plant.

STATE REORGANIZATION

Most of the improvements and innovations effected by the States in their air and water pollution control in recent years have been achieved without major reorganization of State-level pollution control agencies. Thus, many of the measures necessary for these agencies to respond affirmatively to the widespread concern over environmental degradation have been undertaken either under existing State statutes, or by enlarging in various ways the authority of the existing pollution control agencies. Nevertheless, another highlight in recent developments at the State level has been the major reorganization of the State's organizational structure for administrating its pollution control program.

During 1970–71 major reorganizations were adopted in 13 States—Alaska, Arkansas, Connecticut, Illinois, Maine, Nebraska, New Jersey, New Mexico, New York, Pennsylvania, South Carolina, Vermont, and Washington. In addition, proposals for the restructuring of State-level agencies were advanced by the Governor and/or other bodies in a number of other States, and all prospects pointed to continued interest in reorganization of environmental protection programs in the 1972 State legislative sessions.

A number of these recent reorganizations and several earlier ones have been analyzed in depth in *Managing the Environment: Nine States Look for New Answers*, (Elizabeth H. Haskell, Victoria Price, and associates, Smithsonian Institution, Washington, D. C., April 1971). This work concludes that the objectives being sought in these reorganizations are as follows:

1. Consolidate fragmented activities to make program administration match the integrative way problems occur in the environment.

Region Ten Office, Seattle, Washington.

2. Reduce the proliferation of boards and commissions to make State government more manageable, and in some cases change their role and composition to "professionalize" State environmental policy-making and make policy-makers more responsive to elected leaders and the public.

3. Transfer pollution control programs from the health department to broaden pollution concerns beyond health.

4. Create a stronger regulatory role for the State and an agency advocate for the environment.

5. Design a new environmental department that will be more publicly visible, thus demonstrating the State's commitment to environmental protection and rallying environmental interest groups to form a stronger political base for environmental control.

6. Increase accountability of public officials and public programs.

7. Facilitate administrative efficiencies.

The 1970–71 reorganizations increased to 20 the number of States which recently have consolidated various pollution control functions in a single agency other than the State health department. Table 30 gives an overview of the functions consolidated in these agencies.

Two models are guiding the States in these organizations. One is the EPA-like configuration, which is best exemplified by the reorganizations in Alaska, Arkansas, Illinois, Minnesota, Nebraska, Oregon, and Washington. These agencies combine air, water and possibly other environmental protection programs such as solid wastes, pesticides, radiation and noise. The other—the super-department concept adopted in Connecticut, Delaware, New Jersey, New York, Pennsylvania, Vermont, and Wisconsin—combines these environmental functions with all or most of the functions of the typical conservation or natural resources management agency.

Another development in the reorganization of State control pollution agencies has been the reduction or the complete elimination of polluting interest representation on state pollution boards. A *New York Times* survey (Hill, Gladwin, "States Curtailing Polluters on Pollution Control Units," *New York Times*, December 19, 1971.) shows that the number of air or water boards reflecting interests dropped from 35 to 32 during 1971. The number of full-time State environmental agencies rose from eight to nine. More than a dozen States mapped such changes or revamped their regulatory machinery in that direction.

The potential conflicts of interest arise from membership of executives of polluting corporations, representatives of major polluters such as agriculture and local government and State officials who have been spokesmen for agriculture or industry. There is a repeated correlation between persistent pollution and pollution linked control boards.

A good example is Alabama whose boards had heavy industrial representation. Alabama was confronted by extensive mercury pollution of waterways and in April 1971, there was an air pollution episode in Birmingham. In November, Birmingham's industry was temporarily shut down for two days because of health hazards. Today, Alabama's old pollution boards have been replaced with new ones structured to exclude polluter influence.

During 1971 some States passed laws abolishing polluter interest boards and in others, boards were restructured to lessen potential polluter influence and increase the representation of the public at large. In still other States, proposals for more democratic boards are scheduled to be put before the new legislative sessions during 1972.

CITIZEN ACTION

This past year has seen the continued growth and professionalization of the citizen environmental movement. There is full recognition that these groups are viable, and that they are becoming a permanent institution of the community. Citizen groups are striving to be well-informed and solidly credible and many important victories have been achieved. Greater professionalism has been developed because of the need for technical competence in the challenging environmental problems in the community. There has also been a positive movement of private industry and the citizen environmental organizations toward greater cooperation to solve local problems. There is more public recognition that serious environmental problems exist, greater appreciation of the effectiveness of citizen groups and a growing competence on the part of these groups as the complexities of the issues are recognized.

Citizen groups have brought considerable pressure on both the private and public agencies for compliance with Federal as well as local environmental laws. They have lobbied for new laws, such as the one that now bans the development of heavy industry along the Delaware coast. They brought suit against projects which were environmentally detrimental, and in several significant instances have caused major public and private works to be halted. The citizen groups have been using the power of environmental impact statements to bring to the attention of the general public, as well as Government and corporate agencies, programs which were considered environmentally destructive. In most cases, citizen groups have demonstrated a capability of in-depth study and professional skill in dealing with these complex environmental issues.

Citizen groups were involved in numerous community projects that were of serious concern to their own localities, but reflected the national recognition of the environmental problems which are EPA's legislated responsibilities. Communities have been much involved in recycling projects this year which have been a tangible working area for them. The groups have developed from anti-litter campaigns to more complex separation centers that dispose of paper, glass and aluminum cans. There are now recycling centers in many communities throughout the country. These activities are often frustrated by the difficulties of separation and transportation of waste materials to the markets that will pay. Nevertheless, the efforts of citizen groups to clean up and reuse waste materials has had a big impact on the paper industry, and has created a demand for wastepaper from that industry. The aluminum can manufacturers have been working closely with community groups to recover the increasing number of beverage cans produced and discarded. A citizen group in Missouri has opened a three-State glassphalt factory to reuse old glass for roadbuilding material.

In Birmingham, Alabama, the Alabama Conservancy

TABLE 30.—EPA Type Control Agencies

	POLLUTION CONTROL FUNCTIONS						
State and New Agency	Water	Air	Solid Waste	Radiation	Pesticides	Noise	Other Major Control Functions
Alaska Dept. of Environmental Conservation	X	X	X	X	X	—	—
Arkansas Dept. of Pollution Control and Ecology	X	X	X	—	—	—	—
Connecticut Dept. of Environmental Protection	X	X	X	X	X	—	Conservation programs Natural resources management
Delaware Dept. of Natural Resources and Env. Control	X	X	—	—	—	—	Conservation programs Soil, water, and coastal zone management
Florida Dept. of Pollution Control	X	X	—	—	—	—	Weather modification
Illinois (1) Pollution Control Board (2) Environmental Protection Agency	X	X	X	—	—	X	Municipal water supplies
Maine Dept. of Environmental Protection	X	X	—	—	X	—	Limited land use controls
Minnesota Pollution Control Agency	X	X	X	X	X	—	Limited land use controls
Mississippi Air and Water Pollution Control Comm.	X	X	—	—	—	—	—
Nebraska Dept. of Environmental Control	X	X	X	X	—	—	—
New Jersey Dept. of Environmental Protection	X	X	X	X	—	—	Public water supplies Conservation programs Natural resources management
New York Dept. of Environmental Conservation	X	X	X	X	X	—	Conservation programs Natural resources management
North Carolina Dept. of Air and Water Resources	X	X	—	—	—	—	Water resources management
Oregon Dept. of Environmental Quality	X	X	X	X	X	—	—
Pennsylvania Dept. of Environmental Resources	X	X	X	X	—	—	Conservation programs Natural resources management
Puerto Rico Environmental Quality Board	X	X	X	—	—	—	—
South Carolina Pollution Control Authority	X	X	X	—	—	—	—
Vermont Agency of Environmental Conservation	X	X	X	X	—	—	Conservation programs Water use management
Washington Dept. of Ecology	X	X	X	—	—	—	Water use management
Wisconsin Dept. of Natural Resources	X	X	X	—	—	—	Municipal water supplies Conservation programs Water use management Limited land use control programs

has opened an Environmental Information Center to assist the community in their attempts to solve local environmental questions.

These are but a few of the thousands of community projects in which citizen groups are engaged. They look to EPA as their source of support for information, legislation and technical assistance. Dedicated to the environmental cause, they are vitally interested in how this new Agency works and what they can do to assist it.

National organizations such as the League of Women Voters, the Garden Clubs, the Conservation Foundation, National Wildlife Federation, and many others have worked closely with EPA to provide information programs for the public and to provide helpful feedback about public opinion. In October 1971, EPA extended an invitation to 250 of these national headquarter citizens and service and professional organizations, to a day of briefings by the EPA Assistant Administrators, and to technical workshops on the EPA program areas. Each workshop had a prominent citizen leader as a "citizen reactor." Over 400 participants registered. At the conclusion of the program there was a request for a continuation of such briefings, particularly at the local or regional level so that constituent groups could benefit. It is hoped that the Regional EPA Offices will continue this process.

This grassroots movement has spread throughout the U.S. school system. High school, as well as junior high and elementary students, are talking ecology and are taking courses in environmental studies. Many schools have encouraged community environmental projects, and most communities now have local recycling centers at various schools. Last November, in recognition of the impressive efforts of high school students, President Nixon announced a program to bring appreciation to those outstanding environmental projects by establishing the President's Environmental Merit Awards Program. Almost 3000 high schools enrolled. Recently, the program was expanded to include junior high and elementary school studies which again shows the commitment and serious attention of the community to environmental problems. For example, the high schools of Oak Park and River Forest, Illinois, have established

TABLE 31.—Composition of State Pollution Boards

Note: This table is not a classification of States' air and water pollution conditions

● Means state pollution board with regulatory authority contains members associated with basic pollution sources (industry, agriculture, county and city governments).

O Means state board is free of such representation.

"No Boards" means air and water pollution regulation statewide is handled by a full-time state agency.

	Air Board	Water Board	Combination Air Water Board
Alabama	O	O	—
Alaska	—	No Boards	—
Arizona	—	No Boards	—
Arkansas	—	—	●
(1)California	O	●	—
Colorado	●	●	—
Connecticut	—	No Boards	—
Delaware	—	—	●
Florida	—	—	O
Georgia	●	●	—
Hawaii	—	—	O
Idaho	●	O	—
Illinois	—	No Boards	—
Indiana	●	●	—
Iowa	●	●	—
Kansas	—	—	O
Kentucky	●	●	—
Louisiana	●	●	—
Maine	—	—	●
Maryland	—	No Boards	—
Massachusetts	O	O	—
Michigan	●	●	—
Minnesota	—	—	●
Mississippi	—	—	●
Missouri	●	●	—
Montana	—	—	O
Nebraska	—	—	●
Nevada	—	—	●
New Hampshire	●	●	—
New Jersey	—	No Boards	—
New Mexico	—	—	O
(2)New York	—	No Boards	—
North Carolina	—	—	●
North Dakota	●	●	—
Ohio	●	●	—
Oklahoma	—	—	●
Oregon	—	—	●
Pennsylvania	—	—	●
Rhode Island	—	No Boards	—
South Carolina	—	—	●
South Dakota	●	●	—
Tennessee	●	●	—
Texas	●	●	—
Utah	●	●	—
Vermont	O	O	—
Virginia	O	O	—
Washington	—	No Boards	—
(3)West Virginia	●	—	—
Wisconsin	—	—	●
(4)Wyoming	●	—	—

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(1) Pollution sources represented in regional branches of State Water Board.

(2) State Environmental Board is advisory.

(3) Water pollution under State Division of Water Resources.

(4) Water pollution under State Department of Health and Social Services.

a community pollution control center to study and monitor community air and water problems and to promote better environmental awareness in the community. In the Fort Worth area, over 40 high schools and numerous junior high students joined together to collect over two million pounds of paper, and raised almost $7000. They bought thousands of trees to reforest the Trinity River shoreline, following plans developed by a leading landscape architect. A high school in San Clemente, California, has completed a detailed study of their bay area. The Bishop O'Connell High School in Arlington, Virginia, has finished an extensive audiovisual study of water pollution problems in the Metropolitan Washington area, as well as in the States that are part of the Potomac Watershed. Some of their film and slides suggest violations of State and Federal water pollution control laws. The students are awaiting verification of their data. They plan to take formal action against the polluters.

The citizen environmental movement has made a major contribution to environmental improvement and protection. Although conflicts between varied interests have been aroused by citizen activity and there have been some excesses, EPA recognizes their overall positive contribution. There is an encouraging development of cooperation on the part of industry with such groups—a sign that they are responding with flexibility and commitment. Citizen groups have become increasingly aware that environmental problems are "for real." As David Lilienthal said recently, "If environment is a fad, it is man's last fad."

8th grade students from Huntington Beach, California, picking up trash during recess period

Documerica Photo

ENFORCEMENT

One of EPA's major accomplishments has been a vastly accelerated enforcement program. Prompt and decisive action has been taken against both individual companies and municipalities which are not moving ahead vigorously to solve their own pollution problems.

Eight days after EPA's establishment, the Administrator served the cities of Atlanta, Cleveland and Detroit with violation notices, giving them 180 days to take corrective action on severe water pollution problems or risk prosecution. (The three cities subsequently did take such action and were granted financial assistance by EPA to help meet agreed-upon schedules for water improvement. By the end of 1971, 63 such 180-day notices were issued to 52 municipalities and 11 industries.) On January 15, 1971, EPA initiated cancellation proceedings for products and uses of such pesticides as DDT, aldrin, dieldrin and Mirex.

In the first few months, EPA took other significant actions. On December 17, 1971, it called on the Justice Department to prosecute a plywood and paper company in Ohio for discharging wastes into the Great Miami River. Similarly EPA called on the Justice Department to prosecute a major steel company for discharging wastes into the Cuyahoga River. EPA also announced a reconvening of the Lake Superior Enforcement Conference to move ahead on the abatement of mining and sewage pollution of Lake Superior.

In its first two months, the Agency initiated five times as many enforcement actions as all of its predecessor agencies combined in any two month period. These actions underlined the Agency's intent. EPA's presence was felt and taken seriously.

In September, the Florida Power and Light Company agreed to begin an extensive construction program to halt the discharge of heated water into Biscayne Bay. The agreement was contained in a consent decree which the department filed to terminate a water pollution suit brought against the Florida utility on March 13, 1970. The suit, which charged that the heated water damaged marine life in the bay, was the first brought by the Government to stop thermal pollution.

In November of 1971, the Agency invoked emergency powers to restrain industry in Birmingham, Alabama, to abate air pollution in that city. EPA obtained restraining orders in U.S. District Court in Birmingham to halt emission of air pollutants by 23 industries. The authority for the action was provided under Section 303 of the Clean Air Act of 1970.

This was the first time that EPA had taken enforcement action under emergency powers of the Act. The move followed measurements showing that pollution reached a level of 771 and 758 micrograms of particulate matter per cubic meter of air during two successive days. The EPA recommended alert level is for a 24-hour average measurement of 375 micrograms of particulate matter. The "warning" level is 625 micrograms, and the "emergency" level is 875. At the latter level, significant harm to health can be expected. Section 303 of the Clean Air Act provides EPA with emergency powers to seek restraining orders to halt air pollution when there is an "imminent and substantial endangerment to the health of persons."

These enforcement actions frequently produced the desired result of obtaining voluntary compliance with Federal standards. Last September, for example, sugarbeet refineries in 15 states voluntarily agreed to stop discharging organic wastes from their plants; this pollution-control program will cost the industry about $13 million.

Birmingham, Alabama 4/27/71: U.S. Steel open-hearth furnaces contributing to pollution that led to the issuance of the first EPA-Clean Air Act restraining order, against 23 firms here, on 11/18/71.

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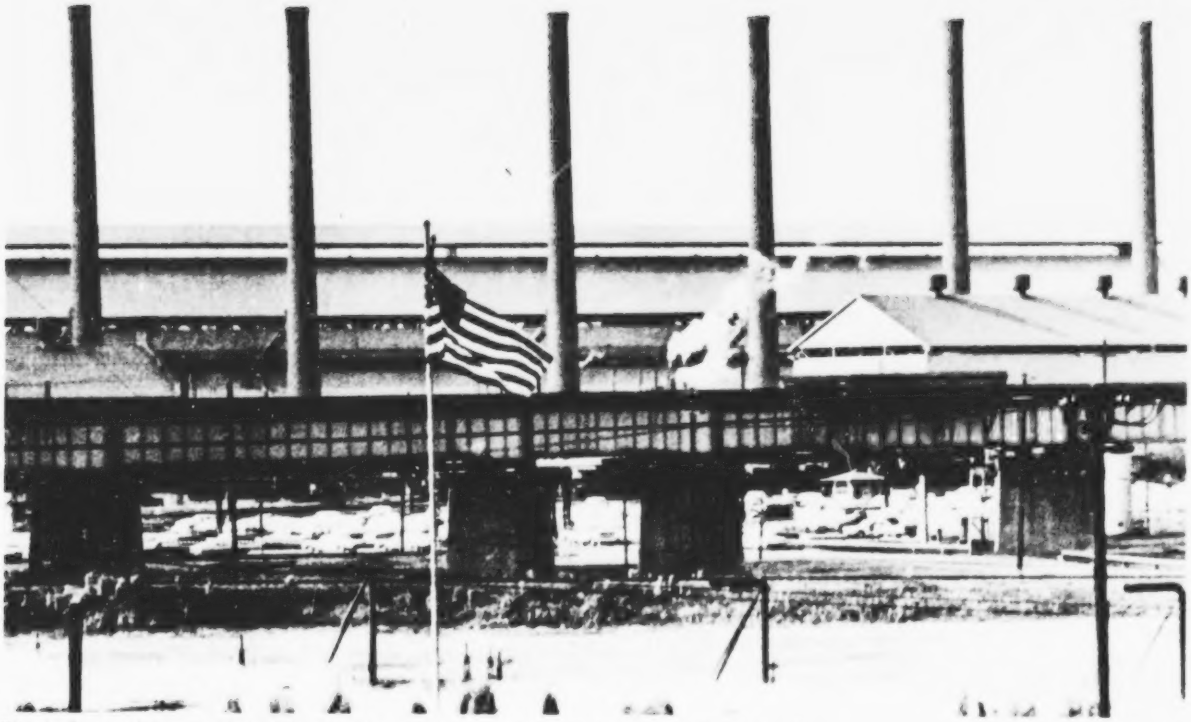

Birmingham, Alabama, 11/18/71: The U.S. Steel plant following its court-ordered shutdown.

WATER

While EPA is working to increase its enforcement authority in the water area, the existing Federal water pollution control legislation represents EPA's broadest enforcement mandate at the present time.

Under authority first provided in 1956 and since expanded, Section 10 of the Federal Water Pollution Control Act provides for the abatement of pollution of interstate or navigable waters (or intrastate where requested by the Governor), which endangers the health or welfare of any persons. Amendments to the Act in 1965 additionally provided for the abatement of pollution, which lowers the quality of State waters below the water quality standards established for those waters, under the authority of those amendments. Consequently, two different enforcement procedures are provided depending upon the circumstances of a particular case.

Where there is judged to be "pollution of waters which is endangering the health and welfare of persons in a State other than that in which a discharge or discharges (causing or contributing to such pollution) originates" the Act provides a three-step procedure. First, the Administrator must call a conference of Federal, State, and any interstate water quality representatives. At this conference, a nonadversary proceeding, opportunity is given to every person contributing to the pollution or affected by it to make a full statement of his views. Following the conference the Administrator then makes recommendations for "necessary remedial action" to the appropriate State water pollution control agency. If, after six months, "action which in the judgment of the Administrator is reasonably calculated to secure abatement of such pollution" has not been taken, the Administrator must then call a public hearing before a Hearing Board of five or more persons appointed by him. Finally, if the recommendations of the Hearing Board to secure abatement are not carried out within six months of the hearing, the Administrator may request the Attorney General to bring suit on behalf of the United

States to secure such abatement. In 53 actions taken under this procedure, only four cases have reached the second step, and only one case has reached court action.

Despite its limitations, the enforcement conference has been an effective mechanism for bringing to light complex and long-standing pollution problems. Because the conference brings together representatives of all State and interstate water pollution control agencies in the conference area, as well as other interested persons including affected industries and municipalities, the open forum so created is most helpful in developing statistics, technical information, and a general understanding of the pollution problems involved. No other enforcement procedure presently available to EPA could develop abatement plans for the number of municipalities and industries involved in a conference. The Lake Erie Conference, for example (involving Michigan, Indiana, Ohio, Pennsylvania, and New York) established detailed remedial programs for 110 cities and 130 industries.

As of 3/31/72

TABLE 32.—Summary of Water Enforcement Actions Pursued by EPA Since December 3, 1970

Preliminary Consolidated Listing		
1. **180-Day Notices**		91
2. **Enforcement Conference-type Actions**		46
Water Quality Standards-Setting Conference	1	
New Enforcement Conferences	9	
Reconvenings and Additional Sessions of Conferences	12	
Progress Sessions	4	
Approvals of Conference Abatement Recommendations	20	
3. **Actions under the Refuse Act**		264
Civil Actions Referred to Justice Department by EPA Headquarters and Regional Offices	49	
Criminal Actions Referred to Justice Dept. by EPA Headquarters and Regional Offices	68	
Non-filing of Section 13 Permit Applications—Cases referred to Justice Department by EPA Headquarters and Regional Offices	69	
Civil Actions initiated by Justice Dept. with Assistance by EPA Regional Offices	30	
Criminal Actions initiated by Justice Dept. with Assistance by EPA Regional Offices	48	
4. **Actions referred under Section 11 of the Federal Water Pollution Control Act exclusively**		9
Total		410

Seven new conferences have been called in the first year of the Environmental Protection Agency: Long Island Sound, Galveston Bay, Western South Dakota, Pearl Harbor, and the Ohio River. Seven conferences have been recommended: Dade County, Florida, the Escambia River and Bay, Perdido Bay, Lake Michigan, Lake Superior, the Monongahela River and the Potomac River.

The second enforcement procedure under the Federal Water Pollution Control Act is used where there is judged to be discharges which reduce the quality of interstate waters below the water quality standards established under authority of the 1965 amendments to the Federal Water Pollution Control Act. Under this procedure, the Administrator first serves notice upon the violator and other interested parties, notably the appropriate State and interstate water pollution control agencies that such violation of water quality standards has, in fact, occurred and must be abated. While the legislative history of the Act directs EPA to hold an informal hearing at the request of a State, the discharger, or other interested party, EPA has provided by regulation for such a hearing in every instance, so that if possible voluntary agreement on an abatement plan can be reached during the 180-day period which must elapse before court action may be initiated, and thus the necessity for a lengthy suit eliminated. Should the violator fail to agree to and begin action directed toward the abatement of the pollution within 180-days of the notice of violation, the Administrator may request the Attorney General to bring suit.

To date, no court action has been initiated. In the case of a steel company in the Lake Erie Basin which failed to comply with the remedial action requirements of the Lake Erie Enforcement Conference, and also failed to comply with water quality standards after the expiration of the 180-day period, the Administrator recommended to the Attorney General that he bring suit against the company under the Refuse Act, as well as under the water quality standards enforcement authority.

During 1971, another authority, in addition to the Federal Water Pollution Control Act, was called into play to assist in resolving water pollution problems. The Refuse Act, Section 13 of the River and Harbors Act of 1899, prohibits the discharge of refuse into navigable waters without a permit, or in violation of the conditions of a permit, and was administered for many years by the Army Corps of Engineers primarily in the interest of navigation.

Although court decisions had supported the use of the Refuse Act in water pollution abatement cases, it was not until 1970 that the 1899 Act came into prominence as a viable water quality enforcement mechanism. It was used as a basis of the suit brought against an electric utility company in Florida to protect Biscayne Bay. It was the basis for 10 Federal suits to abate the discharge of mercury into navigable waters which were brought when voluntary abatement action was discovered to be a threat to water quality and public health.

The Environmental Protection Agency has recommended action under the Refuse Act to the Department of Justice in 152 cases during the first year of the Agency's establishment. One important case is that of ITT Rayonnier, a paper mill on Puget Sound which had failed to meet the requirements of the 1967 remedial action schedule of the requirements of the State discharge permit. After several weeks of negotiation among Federal and State officials and representatives of the company, a civil suit was filed, together with a stipulation under which the company agreed to undertake a $20 million abatement program. The Department of Justice has initiated separately 28 civil and criminal actions under the provisions of the Refuse Act.

AIR

EPA's authority for protecting and enhancing the quality of our air rests in the Clean Air Act of 1965 which was dramatically strengthened by the Clean Air Amendments of 1970. The Amendments require national standards for significant new pollution sources and for all facilities emitting hazardous substances. A framework is established for the States to set emission standards for existing sources in order to achieve the national air quality standards. The Act further requires stringent national emission standards for new automobiles—a 90-percent reduction from existing levels of hydrocarbons and carbon monoxide by 1975, and a 90-percent reduction of nitrogen oxides by 1976. Hence, for the next two or three years the emphasis in the clean air program will be the establishment of broad standards. Under the timetable of the Act, enforcement will come later when the guidelines are fully drawn.

Under the Clean Air Act, all trucks sold in the United States must have a valid certificate attesting that the engines meet applicable air pollution control standards. Automobiles are subject to a similar requirement. In January of 1971, EPA revoked the conditional certification for two heavy duty trucks manufactured by the Ford Motor Company which did not meet the applicable hydrocarbon emission standards. This revocation was the first such action since exhaust testing was required of trucks in 1970. Pending certification of the engines, Ford was required to stop sales of the engines and modify any still in its hands before they could be sold. Within one month of the revocation of certification, Ford completed appropriate modification of the

TABLE 33.—Status of Refuse Act Enforcement Actions Pursued by EPA Since 12/3/1970

(as of March 31, 1972)

Type of Action	Total # of Actions	# of Cases filed	Disposition of filed cases: Fined	Stipulation	Court Order Consent Decree	Dismissed	Pending in Ct.	Cases dropped or prosecution declined	Cases pending in Justice Dept.
Cases referred by EPA to Justice:									
Civil	49	27	—	1	6	—	20	2	20
Criminal	68	19	13	—	—	—	6	7	42
Non-filers:									
Civil	5	5	—	—	1	1	3	—	—
Criminal	4	4	1	—	—	—	3	—	—
Remaining	60	0	—	—	—	—	—	14	46
Total—direct EPA referrals	186	55	14[*]	1	7	1	32	23	108
Justice-initiated Cases, assisted by EPA:									
Civil	30	30	—	1	7	—	22	—	—
Criminal	48	48	23[**]	—	—	—	25	—	—
Total—Assisted Justice Dept.	78	78	23	1	7	—	47	—	—
Total—all Cases with EPA Involvement	264	133	37	2	14	1	79	23	108

[*] Fines imposed total $22,750 for these 14 cases

[**] Fines imposed total $43,294 for these 23 cases

engines enabling them to meet the applicable standards and qualify for certification.

The EPA requested that the Department of Justice sue the Ford Motor Company for delivering some 1972 model cars and light duty trucks to dealers before required emission tests were completed. The tests were required to obtain certification that new motor vehicles were in conformity with applicable Federal emission standards. While the manufacturer took steps to minimize the danger that uncertified vehicles would be driven or sold, the company's shipment of automobiles and trucks to dealers before certification made enforcement of Federal standards much more difficult inasmuch as the shipment was made prior to any judgement as to probable compliance.

The Clean Air Act provides that any person may commence a civil action against the EPA Administrator when there is alleged a failure to perform any nondiscretionary act or duty prescribed in the Act. At least 60-days advance notice must be given to the Administrator at the EPA headquarters in Washington before such suits are filed. In 1971, EPA proposed rules for giving notice of civil suits against alleged violators of standards and abatement orders under the Act. The proposed guidelines provide for the service of notice of lawsuits to individual States, alleged violators, the Administrator and appropriate EPA Regional Administrators. The guidelines say that such notices must identify the complainant and describe with reasonable specificity the act or failure to act, or in the case of alleged violators, the violation, the location and the dates of such violations.

A Federal interstate air pollution abatement conference concerning pollution in the Mt. Storm and Keyser, West Virginia, and Gorman and Luke, Maryland, area was held in May of 1971. The Conference was called under the Clean Air Act, as amended, which calls for EPA to take such action at the request of any State whose Governor alleges that residents of his State are adversely affected by pollution originating in another State. In this case, Maryland's Governor requested a conference because of effects on evergreen tree farms in Maryland of pollution alleged to originate from a power plant in Mt. Storm, West Virginia. Also, the Governor of West Virginia requested that the conference consider other possible sources of air pollution in the area, specifically a pulp and paper plant at Luke, Maryland.

Recommendations for the control of interstate pollution in the area involved were issued by EPA in October 1971, as a consequence of the May conference. The recommendations were effective immediately, and called for reduction of emissions of sulfur oxides and particulate matter from the power and paper plants, reduction of emissions of odorous sulfur compounds from the pulp and paper plant, and provision for abating emissions of particulate matter from several small sources in the area.

PESTICIDES

With respect to pesticides, EPA presently has important enforcement responsibility under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). The responsibility, however, extends only to the registration and proper labelling of pesticides. Comprehensive pesticide control legislation to replace FIFRA has been proposed by the President. The bill is designed to prevent misuse of pesticides by controlling their application, which FIFRA does not do. EPA is working closely with Congress on this new legislation which would give EPA essential new enforcement authorities in the pesticide area (more details in Pesticide Section).

REFUSE ACT PERMIT PROGRAM

On December 23, 1970, President Nixon signed Executive Order 11574 announcing the implementation of the Refuse Act Permit Program, which specified that it be a joint effort by EPA and the Corps of Engineers "to regulate the discharge of pollutants or other refuse matters into the navigable waters of the United States or their tributaries."

The Executive Order provided that the Corps would be responsible for granting, denying, conditioning, revoking, and suspending Refuse Act permits, and in so doing would accept the opinions of EPA on matters of water quality.

The Corps also considers the opinions of State water quality agencies, as indicated by their action on requests for the State's certification that the proposed discharge will not violate water quality standards, or by a written comment on this subject. Section 21(b) of the Federal Water Pollution Control Act provides for this State participation, and says that no permit will be granted if the State denies certification. This is consistent with Section 10(b) of the same Act, which gives the States primary responsibility for pollution control within their own boundaries. EPA works very closely with the States in gathering complete information, developing conditions and suggesting reasonable treatment methods. EPA also determines if interstate waters are affected, and makes the certification or denial if there are no applicable water quality standards, if the State waives its right to certify or if the standards are not being properly applied. Like the State, EPA can direct that the permit be denied.

EPA recognizes fully the primary responsibility of the States to prevent and control water pollution under Section 21(b). The Agency has maintained constant communication with each State, working out procedures to insure that the Permit Program is compatible with existing State programs. There are important values to be preserved in having the line operating responsibility conducted to a maximum extent by State officials. This does not minimize the Federal role in upgrading standards and setting the pace. At the same time, it gives full recognition to the State role and attaches great importance to it.

The President's Order also requires that in addition to the EPA and State agencies the Corps will consult with the Departments of Interior and Commerce. All these agencies consider the effect the discharge will have on possible uses of the receiving water: swimming, fishing, growth of plants and wildlife, navigation and aesthetic purposes.

In addition, the Corps may deny an application for permit if, in their judgment, an obstruction to navigation will result, violating Section 10 of the River and Harbor Act. Thus, the Permit Program was designed to be administered by the Corps with EPA serving as principal environmental consultant. Two memoranda of understanding were drawn up establishing a policy of cooperation between the two agencies. In the first, the responsibilities of each are defined, and it is specified that either shall consult with the other at least 30 days before issuing guidelines, instructions, policies or procedures. Also differences between local personnel will be resolved by forwarding them to Washington; ultimately the Corps will accept EPA's findings on matters of water quality.

The second memorandum regards enforcement. Where conditioning or threat of suspension of the permit is not sufficient to enforce water quality standards, the Justice Department may be asked to seek either injunctive action, or criminal action, which can involve a fine of up to $2,500.

In filing a permit application each discharger submits to the Corps a form which describes the plant location and effluents and general information on plant processes. Those applicants who are on a list of critical industries supply data both on the 11 parameters in Part A of the form, and on those parameters specified for their particular industrial classification in Part B. Part B includes a total of six physical and bio. parameters, 45 chemical parameters, and eight ra logical parameters.

Frequently the discharger will receive a permit on the condition that he install certain treatment facilities by a specific reasonable date, and that he show progress on the installation by specific interim dates. This is called an implementation plan.

When the permit is issued, it requires that the discharger live up to applicable water quality standards, and that he monitor the discharge and report on it at regular intervals. If the discharger does not meet the conditions of the permit, including the time schedule of the implementation plan, he is subject to legal proceedings.

At the same time that the Corps is sending copies of the application to the State, EPA, NOAA, and Interior, a notice and description of the application is sent to appropriate State agencies, local governing bodies, conservation groups, and the local news media. This allows interested groups and citizens to be aware of the proposed discharge and express any opinions. If there is sufficient interest, a public hearing is held.

Such publicity is one of the beneficial side effects of the Permit Program. Under the stimulus of public interest and a nationwide program, some States are strengthening their own permit programs, particularly in adding requirements for monitoring, and in specifying interim dates for implementation plans. RAPP permits are not issued without implementation dates. As the State programs are strengthened, they also tend to become more uniform.

Public awareness also encourages expanding application of water quality standards to streams which now have no applicable standards, and encourages upgrading water-use classification. That is, bodies of water which may now be designated for use for agricultural or industrial use only, may require dischargers to attain a specific level of treatment. If the use is upgraded to require water clean enough to allow fishing and provide a healthy environment for fish, then dischargers must attain a higher level of treatment. Waters designated for use for swimming would require still more treatment.

Research into better treatment methods has been stimulated by RAPP. At present, the best available treatment may be far below what we would like to see; the ultimate goal of research would be complete recycling and reuse.

This eventually can be of financial benefit to industries. At present, some polluters have been unaware of the final chemical compounds they discharge as a result of their plant operations. Now industry is becoming more aware of its own contribution to water pollution and is cooperating in pollution control. Some plants have discovered outfalls they did not know existed and others have consolidated discharge pipes.

To win the battle against water pollution, it must be found out what discharges each company is making, and it must be decided what level of treatment that company needs. This is not easy and it has not been done, and the permit program is a very effective mechanism for requiring companies to come forward with the information on which such judgments can be made.

The most beneficial side effect of RAPP is probably the data being gathered and computerized. A useful amount should be available by July 1972. This will assist research firms, States wishing to upgrade their programs and criteria, and industries, as well as Federal planners.

By any measure the Permit program is a large undertaking. During the first year a total of 20,000 applications were received by Corps of Engineers of which 9,000 were transmitted to EPA for review. The bulk of this review process was conducted in the 10 EPA Regional Offices.

EPA is strongly convinced that the Permit Program will continue to be an effective complement to its other water enforcement procedures. It is, for example, often technically difficult to establish legally that a discharger is the cause of, or a contributor to, a violation of water quality criteria. On the basis of data supplied in the application for a permit, EPA will impose special conditions designed to insure abatement of any criteria violations. If the permittee discharges in violation of the permit conditions, EPA can bring a suit under the Refuse Act without the technical necessity of establishing that the permittee's discharge is a cause of the criteria violation.

In summary, then EPA views the several authorities available to it as mutually supportive and applies them as appropriate to achieve effective, suitable abatement action.

TABLE 34.—Refuse Act Permit Program (As of December 31, 1971)

	COE	I	II	III	IV	V	VI	VII	VIII	IX	X	EPA Total
Applications Rec'd	19,909	1387	647	2030	1857	1544	1368	984	611	191	511	11,130
Critical Industries	15,566	1046	491	1452	1449	1239	1073	778	515	128	467	8,638
Non-Critical Industries	2,964	341	156	578	408	302	295	206	96	63	44	2,489
Applications Complete		9	1	13	55	116	141	449	38	51	12	885
No. Sent to States for Action		0	34	12	18	116	43[4]	345	20	44	7	589
No. of Final State Actions[2]		2	0	2	10	5	533	2	12	5	5	576
No. of Recommendations to the C.O.E.		26	1	1	7	5	16	2	1	1	3	63
No. of C.O.E. Final Actions[3]		0	1	1	1	0	12	2	1	0	2	20

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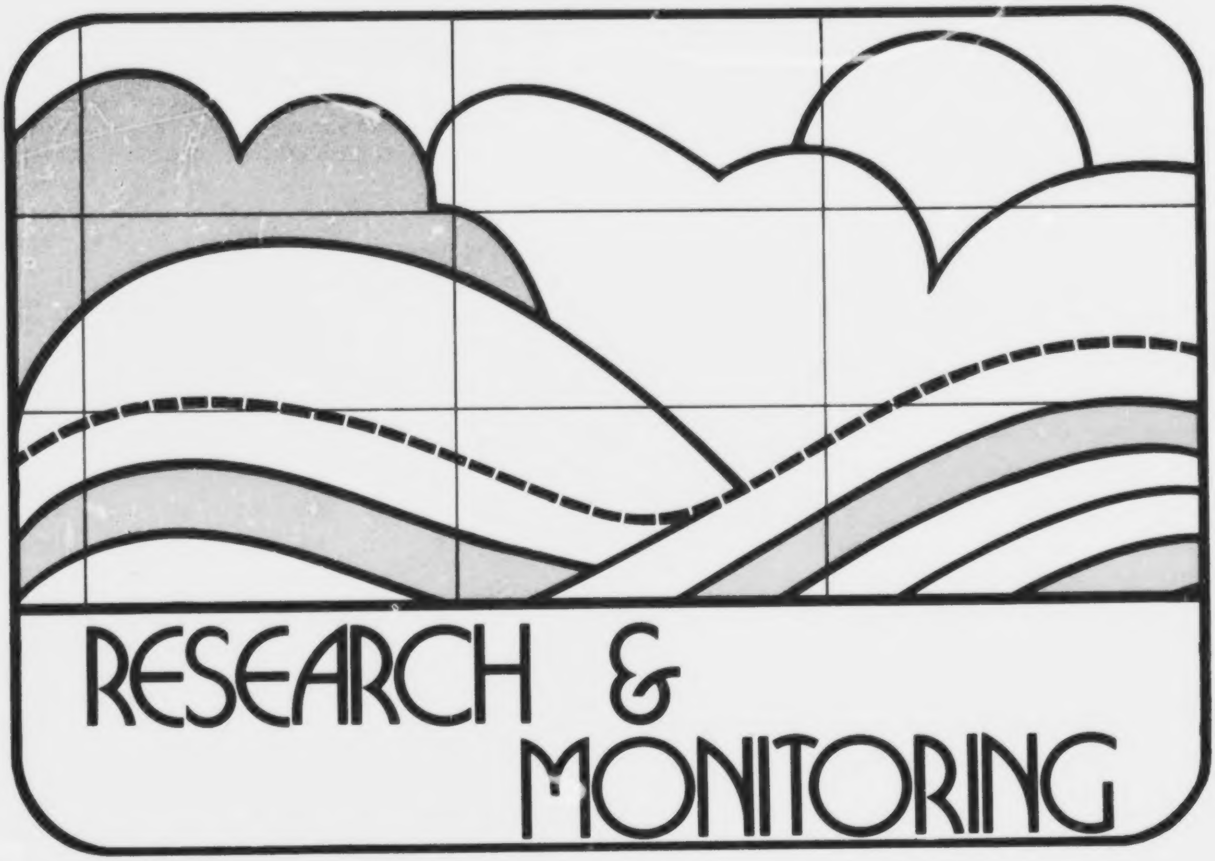
[1] "Critical Industries" are those which are deemed to have an important effect on water quality. This group includes approximately 40 SIC categories.

[2] Final State Actions are: formal certification, informal comment, waiver, or denial of certification.

[3] Numbers of Corps of Engineers' final actions = number of permits issued.

[4] Done only in exceptional cases in this Region.



RESEARCH & MONITORING

RESEARCH

The setting of anti-pollution standards and the enforcement of these standards require a sound scientific base. So much remains to be learned about how to protect the environment that research is the full-time occupation of one in every four people on EPA's payroll, and the part-time occupation of hundreds more. The need for research is put into even clearer perspective by the fact that over 75 percent of all EPA research efforts are conducted outside the Agency by means of contracts and grants, thereby multiplying the effectiveness of the EPA research staff.

ORGANIZATION

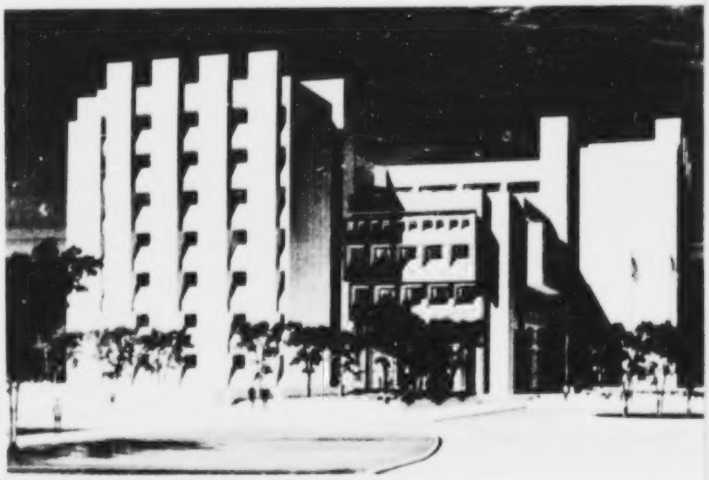
Most EPA research is applied. While one of the aims of research is to define and prevent environmental problems before they develop, all such research should be applicable in solving environmental problems. Further, EPA must constantly respond to practical immediate situations. For example, the Clean Air Amendments provided that EPA set nationwide standards for the six main types of air pollution: sulfur oxides, particulates, carbon monoxide, hydrocarbons, nitrogen oxides, and photochemical oxidants. EPA had to define the levels of these pollutants that endanger human health and to define how the pollutants were to be measured, as well as to determine the steps the States should take to achieve the standards. The States were required to develop implementation plans and to submit them to EPA by January 31, 1972.

Research accounted for nearly $125 million of EPA's Fiscal Year 1972 budget. Almost 1,900 scientists, technicians, and support personnel, representing 59 different scientific disciplines and specialties, comprise EPA's in-house research team.

EPA's research falls into four main categories: the processes and effects of pollutants; the technology to abate pollution; the results of pollution abatement; and man's long-range impact on the environment. Pollution problems are intimately related to one another. Because of this, EPA's research emphasizes the study of all types of pollution (solid waste, pesticides, radiation, and noise), and polluted media (air, water, and land), when dealing with any environmental concern.

Research personnel came from existing environmental control programs in five Federal Government agencies: a water quality program from the Department of Interior; water hygiene, air pollution control, and solid waste management programs from the Department of Health, Education, and Welfare; radiation exposure control programs from HEW and the Atomic Energy Commission; and pesticides control programs from the Department of Agriculture, the Fish and Wildlife Service of the Department of the Interior, and HEW's Food and Drug Administration. Before their reorganization into EPA, these researchers in the different agencies conducted research independently from one another, without one agency having leadership responsibility. The results were often overlapping responsibilities, as well as failure to recognize some pollution problems.

Implementation of EPA's research program is conducted by four National Environment Research Centers (NERC's). The NERC's are located in Research Triangle Park, North Carolina; Cincinnati, Ohio; Corvallis, Oregon; and Las Vegas, Nevada. These field units report directly to EPA Headquarters. The NERC's represent a new concept in environmental research by bringing together research on air, water, pesticides, etc. They have jurisdiction over a combined total of 42 full-fledged laboratories located in 18 states stretching from College, Alaska, to Perrine, Florida, which are valued conservatively at $55 million. Supplementing these facilities are more than 130 related resources, such as water craft, instrumental aircraft, field stations, and monitoring sites. The organization of the laboratories and other resources was a major concern during 1971. A plan to relate



EPA Environmental Control Lab., Cincinnati, Ohio.

laboratory resources to EPA missions and programs has been prepared by the Agency's "Laboratory Study Task Force."

Processes and Effects

A $53 million budget is allocated for studying the processes and effects of pollutants. This program is implemented through all four NERC's. Such pollutants as chemical substances, biological materials, radiation, noise, and heat are identified. Also, pollutant sources, and physical and biological paths are identified. The effects of pollutants on man, other living organisms and non-living things are studied, and models for the total eco-system are developed. Processes and effects include the health effects of pollutants; the ecological and other non-health effects of pollutants; the movement and transformation of pollutants; the measurements, measurement methods, and instruments used in assessing pollution problems; and water supply research.

A large threat to the Nation's health is the 250 million tons of manmade waste annually dumped into the air. Consequently, researchers are conducting a nationwide study—the first of its kind—on the effect of air pollution on humans. The Community Health and Environmental Surveillance Studies (CHESS) directed by the Research Triangle Park NERC, is comparing the health of those who breathe polluted air with that of those who are not exposed to such pollution. Working in over 30 different communities throughout the country, EPA scientists and technicians have the cooperation of 38,000 volunteers. They eventually hope to have 200,000 such volunteers who are willing to have their health monitored. Communities have been selected with high and low sulfur dioxide, nitrogen oxide, particulate and photochemical pollution. With the cooperation of school, hospital, and government officials, the scientists are seeing how each pollutant affects a person's short and long-term health.

CHESS is attempting to answer a host of questions: What effect does long exposure to polluted air have on school absenteeism? Is there an increased frequency of acute and chronic respiratory disease in highly polluted environments? Do pollutants concentrate in specific organs and cause their malfunction? Does the death-rate rise and fall in rhythm with a day's pollution? Is there a correlation between heart attack and high pollution? Already, some tentative answers are coming in.

CHESS closely relates with EPA's air pollution standards by providing data on the health effects of various levels and types of pollutants. It is hoped that the new air standards will lower the levels of pollution in CHESS communities and improve health and welfare. CHESS will provide the means of measuring the amount and effect of those improvements.

Marked geographic differences in mortality exist in this country, and a logical explanation for such differences is the effect of the environment. Therefore, in cooperation with the CHESS project, EPA is comparing morbidity and mortality data with data on drinking water quality. Such correlations will not give definite answers, but they can develop leads for more specific studies.

EPA plans to use specialized Army aircraft in a National Eutrophication Survey. The Agency will employ both fixed wing aircraft and helicopters in a nationwide aerial survey of approximately 1,200 lakes. The purpose of the project is to identify bodies of water in the U.S. with potential or actual eutrophication (accelerated aging) problems brought on by the discharge of excessive amounts of phosphates into them from various sources. Phosphates are nutrients that cause rapid growth of algae in bodies of water. When the algae decay, the process depletes the supply of oxygen

ENVIRONMENTAL PROTECTION AGENCY
MOTOR VEHICLE EMISSION LABORATORY

Ann Arbor, Michigan: EPA's first Federal Laboratory specifically designed to perform automobile pollution control research.

and results in premature "aging" of a lake or pond, including the disappearance of desirable varieties of fish. Lake Erie has been widely cited as a classic example of eutrophication.

The survey would determine the present conditions of the lakes, where the overabundance of nutrients is coming from, and where the condition of the lakes can be improved by curbing the phosphorus reaching the water from municipal treatment plants. It is an integral part of EPA's control program to assist State and local governments, through construction grants, in reducing excess phosphates by additional municipal waste treatment.

EPA is also developing a series of "water models." Essentially, this kind of mathematical model is a set of analytically related factors in a defined system which simulates the causes and effects of pollution on a living body of water. These factors can be varied, and a correlation between causes and effects can be identified. It has been discovered for example, that every lake, stream, and river tolerates pollution differently, depending on its physical and chemical characteristics. The onset of eutrophication depends on the water's temperature, mineral content, natural aeration, chemical input, flora, and fauna. In some lakes, the addition of relatively small quantities of phosphates could tip the balance and bring on eutrophication. In other lakes, for different reasons, nitrogen might be the critical variable. As yet the most harmful pollutants can not be predicted.

Armed with the predictive ability of such water models, however, planners will be able to strategically place and size treatment plants, and to design the best kinds of treatment plants to remove the offending chemical. In a related research effort, the Southeast Water Laboratory at Athens, Georgia, reporting to Corvallis, is beginning to use a $750,000 eco-system simulator to examine how fertilizers, pesticides, and rural runoff from industry, fiber production, paper processing, poultry processing, and phosphate mining, all effect streams and fish and plants therein. The simulator is an actual water course for which all variables, such as aeration, mineral content, diurnal cycles (sunlight, temperature, etc.) and turbidity are controlled. These factors can be changed to see how each influences the evolution of pollutant effects in streams. The pollutants can also be varied to see how they effect stream life. In a similar vein, atmospheric models are being developed to control and abate air pollution.

In 1971 the environmental effects of a nuclear power plant which was submerged in 250 feet of water were studied. The program, handled by General Dynamics under contract, showed that fewer organisms would be killed at a submerged plant than at a plant located on the coast.

Technology

EPA allocated $69 million for fiscal 1972 to provide the technology necessary to abate and control air and water pollution and to improve solid waste management. This research function includes municipal environmental protection technology, applied science and technology, air pollution technology and solid waste control. These programs are conducted through the NERC's and their associated laboratories.

Developing technology for water pollution control of municipal wastewaters is of chief concern. The number of sewered communities in the U.S. is just under 13,000. These facilities serve only 63 percent of the Nation's population. As a result, raw or inadequately treated sewage from millions of people flows into the streams. And, although many communities have been installing and improving their waste treatment facilities, over 1,000 communities outgrow their treatment systems each year. It is estimated that waste loads from municipal systems will increase nearly four times over the next 50 years. In addition to the sewage wastes, storm drainage systems in urban areas are a serious problem. Presently serving over 14 million square miles of urban area, storm drainage systems discharge, without treatment, the collected runoff from rainfall and snowmelt into water bodies. Significant projects dealing with municipal wastewater during 1971 included the development of methods for upgrading existing treatment plants, the removal of phosphorus from lakes by the addition of chemicals, the development of techniques to control and treat combined sewer overflows and storm water discharges and the development of engineering methodology for reaeration of rivers and lakes.

The pollution load coming from industrial sources, agriculture, mining and marine sources is another concern of technology research. Pollution coming from industrial sources is equivalent to the pollution caused by a population of approximately 400 million. Because of the "slug"-like load which is characteristic of animal feedlot runoff after significant rainfall, the concentration or organic pollutants emanating from agricultural sources may be as high as 100 times that of raw municipal sewage. Other forms of agricultural pollution include nutrients and pesticides, as well as salts and other pollutants in irrigation return flows. Already research and demonstration projects funded by grants have found solutions to many of these pollution problems.

Pollution resulting from mining is also a concern of technology research. An estimated four million tons of acid from mine drainage discharges annually into more than 4,000 miles of U.S. streams. There are many active grant and contract programs conducting research and demonstration projects on this problem. In fact, very shortly an estimated 11 states should be participating in solving this pollution problem.

The daily amount of solid waste discarded by households and commercial and industrial establishments is equivalent to seven pounds per capita. The situation is compounded by the fact that nearly every means of disposing of these wastes (burial, burning, deep sea disposal), contributes to pollution. At the same time, these wastes have the potential to become new resources for fuel, raw materials and even animal feed supplements.

Under the authority of the Solid Waste Recovery Act of 1970, much of the research for solid waste technology is being conducted by the contract and grant mechanism. For example, under a demonstration grant, the Union Gas and Electric Company of St. Louis has developed a system which generates electricity by burning ordinary municipal refuse.

Cellulose-containing materials, such as paper, rags and glass, constitute 50 to 60 percent of all municipal waste. In addition, millions of tons of crop residues and wastes from lumber, pulp and paper industries must be disposed of annually. Consequently, EPA is supporting a study at Louisiana State University aimed at converting the cellulose in these solid wastes into new, useful products.

During 1971, the ongoing programs in the field of air pollution technology, were managed by the Office of Air Programs, and therefore are discussed in the Air Quality Section. However, research related to the abatement and control of air pollution from stationary sources will now be conducted by the Office of Research and Monitoring. The major emphasis of this research will be related to the desulfurization of fuel gases from thermoelectric power plants.

Implementation

Two and a half million dollars is used for the development and evaluation of courses of action which implement environmental protection. This research function is concerned with techniques for selecting environmental standards and for assessing both the benefits and the anticipated costs of achieving those standards. The former emphasis on technological capability and economic feasibility is avoided. Techno-economic considerations are weighed against ecological, environmental and human considerations. Economic analyses are used to evaluate the costs and benefits of pollution control methods. Research is being continually conducted to refine these analytical techniques. Fiscal solutions, together with more effective pollution control laws for their application, are being examined in an effort to make pollution control enforcement more effective, to provide incentives for environmental quality and to minimize public funding of pollution control. The complex interaction among population growth, economic growth and technological change is also being examined in order to avoid pollution resulting from this interaction.

Finally, research which helps the Agency to comment on environmental impact statements is being conducted. For example, one major undertaking has been to coordinate EPA's input into the Southwest Energy Study, which concerns the construction of a power plant capability in or near the Four Corners area (the point at which Utah, Arizona, Colorado, and New Mexico all meet).

Environmental Studies

The broad area of man's effect on the total environment is the concern of EPA's environmental studies which provide understanding of the total effects of environmental policy. Such studies as the future of cities, metropolitan areas and regions to ascertain what they will, or should, be like are conducted. The purpose of these studies is to enable EPA to move from a position of reacting to environmental crises to one of anticipating and shaping events.

MULTIFACETED PROBLEMS

Some multifaceted problems were handled by research during 1971 such as the controversy over the use of phosphate versus non-phosphate detergents. The public was aware that phosphate-containing products cause eutrophication. But some of the non-phosphate products also suffered serious shortcomings, such as accidental poisoning of young children by caustic detergents. In particular, nitrilotriacetic acid (NTA, a major contender to replace phosphate in detergents) was believed to cause cancer. Consequently, after research on this difficult dilemma, EPA retreated from its former strong position against phosphate detergents. In October 1971, EPA announced that the Agency's immediate policy would depend on the public's choice of detergent according to the local situation: where there is no eutrophication problem, for example, the housewife can choose phosphate detergents; where there is a local eutrophication problem, however, she could use a non-phosphate detergent. If this latter housewife has small children, immediate EPA policy suggests that she make the choice herself between the non-phosphate and phosphate detergent. Longer-term EPA phosphate policy, however, would call for removing household detergents at municipal sewage treatment plants before they could enter local waters.

It is imperative that EPA's research be delivered to users and be put to maximum practical use. In cooperation with industry, EPA has published and distributed data on more than 200 water pollution research and demonstration projects. Grant, contract, and EPA research activities generate technical pollution control reports on current information concerning air, pesticides, solid waste, water and radiation. These reports are printed in government publications and professional journals and as contractor reports. Reprints are available to other Federal, State, and municipal agencies, as well as, to the public.

Under the Agency's technology transfer program, the latest available technological data concerning pol-

TABLE 35.—U.S. Environmental Protection Agency Chess Community

U. S. ENVIRONMENTAL PROTECTION AGENCY

CHESS COMMUNITY

●Number of Communities

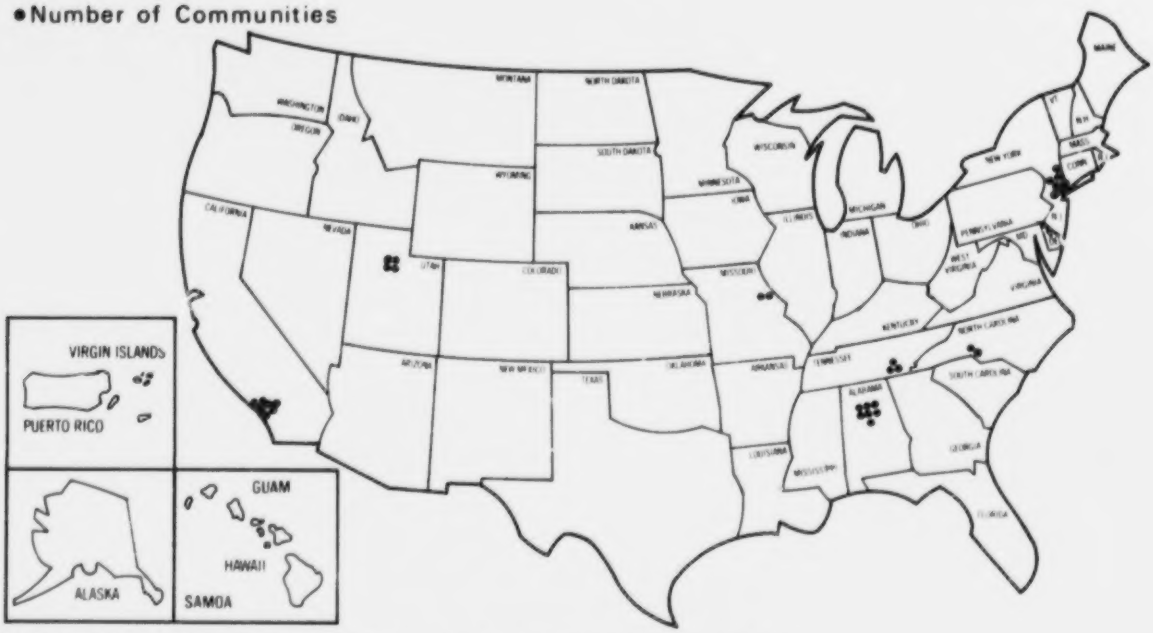

VIRGIN ISLANDS
PUERTO RICO
GUAM
HAWAII
ALASKA
SAMOA

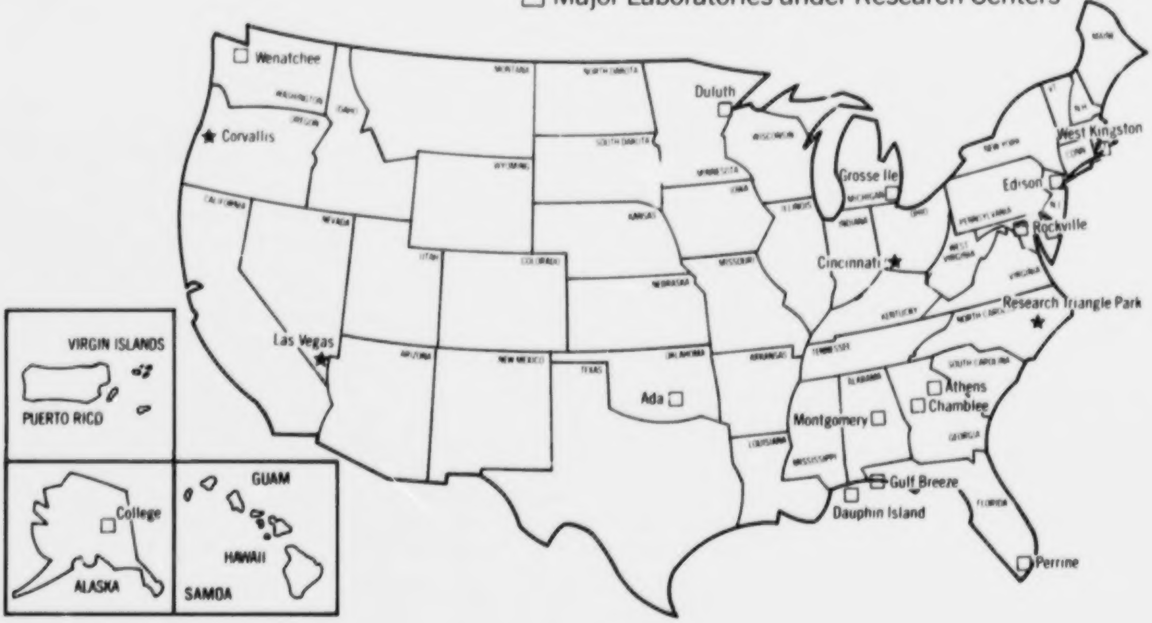
TABLE 36.—U.S. Environmental Protection Agency Research Laboratories

U. S. ENVIRONMENTAL PROTECTION AGENCY

RESEARCH LABORATORIES

★ National Environmental Research Centers

☐ Major Laboratories under Research Centers


Wenatchee
Corvallis
Duluth
Grosse Ile
West Kingston
Edison
Rockville
Cincinnati
Research Triangle Park
Las Vegas
Ada
Athens
Chamblee
Montgomery
Gulf Breeze
Dauphin Island
Perrine
College
VIRGIN ISLANDS
PUERTO RICO
GUAM
HAWAII
ALASKA
SAMOA

lution technology have been incorporated into four process design manuals. Available to municipal and design engineers, these publications deal with suspended solid removal, carbon absorption, phosphorous removal and the upgrading of existing treatment facilities. In 1971, 12 seminars, attended by a total of 1,200 engineers, were held to disseminate information concerning the manuals and other subjects.

The Challenge Ahead

More research is needed of our environment in all areas. To maximize the benefits from extramural research endeavors, all grants and contracts are now being reviewed by the Research Office for relevancy to EPA's missions and specific ongoing programs. There is temptation to recoil at the complexity of the environmental problems still ahead; yet, these problems cannot be researched piecemeal. They must be considered with the broadest possible perspective, taking into account all environmental implications. Otherwise, the solutions might cause still other, perhaps more serious, problems.

ENVIRONMENTAL MONITORING

The efficient control of variables affecting environmental quality requires the use of reliable and timely information. Thus, the key to effective environmental quality management lies in the ability to continually monitor environmental characteristics and to provide interpretation of the data obtained. Such data are essential throughout the pollution abatement effort—from initially identifying the problem to finally providing direct evidence in enforcement actions.

The monitoring of the Nation's environmental quality is a cooperative effort involving Federal, State and local agencies. Its main objectives are to characterize existing environmental conditions, identify trends, evaluate compliance with standards and assess the interchange of pollutants among air, water, soil and living matter. Monitoring of all media is necessary in order to take into account the "total body burden"—that is, how much of a given substance an individual is exposed to whether it comes from air, water or land.

The collection and timely evaluation of reliable information on environmental quality always has been needed, but now it is a requirement with the establishment and implementation of air and water quality standards and the resulting necessity of developing abatement strategies. Regardless of the number of control facilities and devices installed or the number of environmental quality management plans completed, in the final analysis, program effectiveness only can be measured in terms of actual environmental quality improvements. And, this can be achieved only through adequate monitoring of environmental quality.

EPA monitoring activities are carried out in two ways: through networks and special studies. The networks are made up of permanent stations located in urban and non-urban areas throughout the nation. These networks, now being implemented, serve to identify overall environmental quality, regional and national trends and problem areas. Where information is not provided by the networks as needed, special studies are performed. Together, these two categories of monitoring provide the environmental quality information needed by EPA to carry out its mission.

Monitoring of pollution source emissions and effluents on a routine basis is also necessary. This activity, however, is the primary responsibility of pollution control facility managers and of local and State pollution control agencies. Currently, emphasis is being given to the integration of the formerly widely scattered monitoring activities into a unified program for total environmental assessment. When completed, these integrated networks will provide full assessment of pollutants, such as pesticides, not limited to one medium—air, water or land—and that are difficult to combat by single media-oriented control programs.

There are over 3300 stations in the United States where air quality measurements are taken. State and local agencies operate about 3000 stations with the remaining 300 operated by EPA. Complexity of the monitoring stations varies considerably. Some stations are equipped with automatic instruments where as many as 10 pollutants are monitored continuously. In some cities, these stations automatically transmit continuous data to a central location for display and analysis. Most, however, employ very simple devices for period collection of samples.

EPA's 300 station air quality monitoring network is national in scope and represents a progressive growth of types and numbers of monitors since the particulate pollution network was first installed in 1953. All of the stations in this network are stationary, that is, fixed at one point. The great bulk of sampling is conducted on an intermittent basis, usually for a 24-hour sampling period at two-week intervals; however, a continuous monitoring network of six stations using highly sophisticated collector-analyzers was established in 1961. In all, over 40 pollutants found as particulates, gases and liquids are routinely measured. As States and cities expand their capability for measuring the more common pollutants, EPA's role will be redirected toward coordination of these efforts and monitoring of non-routine pollutants.

The EPA air contingent also conducts a number of special investigations. During the summer of 1971, instrumentation for monitoring carbon monoxide and photochemical oxidants (ozone) were installed in about 40 major cities to provide data for implementation plans required of the States. Studies were also conducted to determine the air quality on and around roadways, within buildings adjacent to the expressways and around airports. Surveillance programs have been established to monitor emissions from new and in-use light duty motor vehicles. This information is important since it supports the setting of standards.

A program to measure the effect of air pollution levels on selected human populations in nine communities is in progress. Study results provide epidemiological data in support of air quality standards setting. Total suspended particulate, SO_2, tapwater, NO_2, oxidants, and other pollutants are routinely measured in each community.

Air quality data collected through the above monitoring activities are required by EPA, many local and State agencies and other organizations. To satisfy these needs, the National Aerometric Data Information System (NADIS) was recently established. During the past year, most historical air quality data collected by State and local agencies have been entered into the system. Mechanisms for routine storage and analysis of current data have also been established and are operational.

In addition, the National Emissions Data System (NEDS) has been established to store for rapid retrieval and data analysis all point source and emission inventory data supplied from implementation plans, rapid surveys and point-source tests. These data will be used to assist EPA, State and local agencies in evaluating the success of their pollution control programs.

The EPA water quality monitoring network is currently in the implementation stage. Approximately 900 Federally-funded stream and open-water stations (60 of which employ automatic monitors) are in operation throughout the nation. From 10 to 30 pollutants are routinely evaluated at each station. Sampling frequencies vary from continuous to once annually, depending on the particular pollution and the station of concern.

A considerable amount of short-term water quality monitoring is also currently performed. Over 5000 locations are sampled for periods ranging from several days to several months each year. Information gathered in these surveys is used to support EPA enforcement actions, develop mathematical models for simulating water quality responses, support research studies on the fate of pollutants and assess the effectiveness of pollution control practices.

All data collected through these long- and short-term activities are entered into EPA's computerized water data Storage and Retrieval (STORET) system. Additionally, water quality data collected at approximately 1000 long-term and 5000 short-term, State-operated monitoring stations also are entered into STORET by the State agencies.

The EPA program in pesticide monitoring has developed significantly over the past year. Routine monitoring of pesticides in air, water, land, and biological matter is now underway on a nationwide basis. The recent development of analytical methods for measuring in air 10 of the most common pesticides allowed the implementation of an eight-station pilot network for assessing atmospheric levels of pesticides. Pesticide monitoring in rivers, lakes, and estuaries is conducted as part of the water monitoring sub-network. In 1971, pesticide levels in water were determined routinely for over 300 locations. The national soils monitoring program for pesticides consists of sampling 13,300 sites covering both crop lands and non-crop lands. In 1971, samples were taken at 3000 of these sites. In addition, fish and shellfish were collected at over 300 locations and analyzed for pesticide content.

TABLE 37.—Monitoring and Surveillance—Air

Estimated Numbers of Air Quality Monitoring Stations

	FY 1969			FY 1970			FY 1971			FY 1972		
Types of Stations	Federal	State[1]	Total	Federal	State[1]	Total	Federal	State[1]	Total	Federal	State[1]	Total
Simple	250	1,500	1,750	250	2,000	2,250	250	2,500	2,750	268	2,732	3,000
Complex	15	180	195	15	230	245	7	250	267	13	337	350
Total	265	1,680	1,945	265	2,230	2,495	267	2,750	3,017	281	3,069	3,350

[1] Includes stations operated by local agencies.

Note: The numbers of stations are estimated based on the number of instruments available at the end of the year; there is great variability in the capabilities of individual stations. Simple stations generally have capability to sample for suspended particulates, while complex stations include continuous gas sampling capability.

A study of health effects resulting from pesticide exposure covering 14 separate areas is also in progress. Its purpose is to evaluate the effects on human health from repeated exposures to pesticides. As part of this study, samples of food, water, air and soil along with human tissue are collected and analyzed.

Radiation monitoring in the United States consists of the collection of air, water, precipitation, milk, human bone and total diet samples for analysis of specific radionuclides such as plutonium, strontium, cesium and tritium. The radiation monitoring stations are nationwide in scope and serve as an alert to initiate more indepth studies if so indicated. EPA also provides monitoring services in direct support of the Atomic Energy Commission's (AEC) underground nuclear testing program. Overall, there are 180 stations where air samples are taken, over 200 stations where water samples are taken, and nearly 100 milk sampling stations. Additional sampling sites are on a standby basis. Mobile and aerial monitors are also on standby for radionuclide monitoring and sampling during each nuclear test. EPA is currently expanding its monitoring activities to also provide information related to nuclear power operations on a nationwide basis.

A monitoring program for assessing noise levels and trends on a nationwide basis is in the planning stage. Long-term monitoring stations are needed to obtain baseline information on the range of noise levels nor-

TABLE 38.—Monitoring and Surveillance—Water

Monitoring Stations (Cumulative)	1968	1969	1970	1971	1972	1973	1974	1975	1976
Key Locations, Long-Term: [1]	667	800	1,385	1,375	1,800	6,000	9,000	12,000	15,000
EPA Funded	367	400	885	875	800	3,000	4,000	5,000	5,000
State	300	400	500	500	1,000	3,000	5,000	7,000	10,000
Non-Key Locations, Long-Term: [2]	3,500	3,700	8,000	8,000	10,000				
Other Federal Agencies	1,000	1,000	5,000	5,000	5,000	Not Available			
State	2,500	2,700	3,000	3,000	5,000	Not Available			
Federal & State Short-Term Stations [3] (Mostly Inactive)	10,000	15,000	20,000	30,000	40,000	Not Available			

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[1] Key locations, long-term monitoring stations are stations on major navigable waters in the vicinity of State and International boundaries and major metropolitan areas as well as in the contiguous zone for the purpose of measuring water quality for compliance with established water quality criteria.

[2] Non-key, long-term monitoring stations are on Interstate and Intrastate waters for measuring compliance with water quality standards within a State. A majority of these stations are operated by Federal agencies such as U.S. Geological Survey, TVA, Corps of Engineers, and Bureau of Reclamation that sample primarily for purposes other than water quality control.

[3] Federal and State short-term stations are operated to develop supplemental information through an intensive sampling program to obtain detailed information on a particular problem or problem area. When the required water quality data has been obtained, over a period of two weeks to two years, the sampling is stopped.

TABLE 39.—Monitoring for Residues of Pesticides

Residues Monitored in Soils, Land Run-Off, Sediments, and Crops to Provide Data for Evaluation of Label Registration Applications and Residue Tolerance Petitions.

				(Projected)	
	FY 1969	FY 1970	FY 1971	FY 1972	FY 1973
Number of Sites Sampled	2,003	2,542	1,783	2,233	3,750
Number of Samples Collected for Analyses of:					
Soil	2,000	2,150	1,575	2,233	3,750
Crops	615	1,000	1,183	1,200	2,300
Water	168	142	—	150	150
Bottom Sediments	128	142	—	150	150
Biologicals (Fish, Fish Foods, Etc.)	—	284	200	200	400

- Non-cropland sampling in 10 States: Idaho, Washington, Nebraska, Georgia, Maine, Arizona, Wyoming, Iowa, Virginia and Maryland.
- Cropland sampling is performed throughout the continental United States, except Oregon, Montana, Minnesota, Kansas and Texas.
- Urban area sampling is provided in 20 cities across the nation (e.g., Bakersfield, California; Camden, New Jersey; Houston, Texas; Salt Lake City, Utah; Greenville, Mississippi; Sikeston, Missouri; Charleston, South Carolina; Memphis, Tennessee; Richmond, Virginia; Mobile, Alabama).
- Additional cities sampled are: Baltimore, Maryland; Newport News, Virginia; Macon, Georgia; Gadsden, Alabama, and Hartford, Connecticut.

mally encountered across the Nation and to identify trends in these levels with time. Special studies are being carried out as necessary to identify and characterize specific sources and causes of noise and the effects of noise on humans, wildlife and property.

A national solid waste data network is being implemented. It will serve to inventory and analyze on a nationwide basis information pertaining to solid waste legislation, the administration and management of solid waste programs, solid waste generation, solid waste characterization and solid waste management systems. This information is essential and must be readily available to decision-makers responsible for the effective and efficient control of solid waste problems at the local, county, State and Federal level.

In large measure, the success of an environmental pollution control program rests upon the reliability of the data provided by monitoring activities. Meaningful assessments of environmental quality, whether they be within one, or among several, environmental media, require valid data. When such assessments are made in support of an enforcement action, the data used must be legally defensible. That is, the data's validity must be clearly demonstrable to the satisfaction of a court of law.

The acquisition of reliable, comparable and legally defensible data requires EPA-wide use of a set of standardized measurement and calibration procedures, an interlaboratory quality control program, a laboratory performance certification program and a standardized laboratory record-keeping procedure. These serve not only to ensure data uniformity and reliability, but also to document the quality of the data produced.

Standardization and quality control programs were under varying stages of development by the various EPA environmental monitoring activities at the time EPA was established. Emphasis is currently being given to the coordination and integration of these programs as their development proceeds.

Emphasis is also being given to the development and adaptation of advanced monitoring techniques, such as remote sensing from aerial platforms, for use in monitoring the environment. These techniques show much promise and, eventually, may significantly reduce the amount of manual sampling and analysis now required to provide adequate nationwide coverage of the environment.

Collection of water samples.

TABLE 40.—Monitoring and Surveillance—Radiation

Network	Date Initiated	Number of Stations	Frequency of Sampling	Analysis Performed
Radiation Alert Network	1956	70	Daily	Gross beta field estimate with laboratory analysis of selected samples for fission, products, pultonium, and tritium. To alert EPA and the states to increased levels of radioactivity in precipitation and airborne particulates.
Pasteurized Milk Network	1960	63	Monthly	For measures of radionuclide levels in pasteurized milk and for establishing environmental trends.
Institutional Total Diet Sampling Network	1961	29	Quarterly	Measures the level of exposure in the total diet of a selected population group.
Tritium Network, (Tap Water, Precipitation and Surface Water)	1964	117	Monthly/ Quarterly	Tritium analysis in order to provide surveillance at selected surface water stations downstream for potential sources of tritium release.
Carrier Water Supply	1960	660	3-Year Intervals	Test for gross alpha and gross beta radiation and specific radionuclides when gross levels are unusually high.
Human Bone	1961	Variable	125 Samples per Quarter	Test for strontium 90 content in relation to calcium.

TABLE 41.—Number of Stations at Which Various Parameters are Evaluated in the Water Quality Monitoring Network

Parameter	Number of Stations
Temperature	885
pH	853
Dissolved Oxygen	788
Specific Conductivity	732
Chloride	687
Nitrogen	673
Common Ions	655
Phosphorus	618
Dissolved Solids	594
Turbidity	586
Coliform	582
Hardness	514
BOD	451
Color	379
Suspend Solids	367
Pesticides	338
Radioactivity	258
Minor Elements	246
Carbon	124

FEDERAL ACTIVITIES

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FEDERAL ACTIVITIES

POLLUTION FROM FEDERAL ACTIVITIES

The Federal Government carries on many activities that have an impact on environmental quality. It maintains installations and buildings; manages lands; constructs water resource development projects; dredges waterways; and operates huge fleets of vehicles, vessels and aircraft. Today, the Federal Government owns approximately 20,000 installations and one-third of the country's land. In addition, each year it awards well over 100,000 procurement contracts for the manufacturing of materials, supplies and equipment. It provides financial assitance to support highway construction, housing development, urban renewal, farming operations, economic development and recreation projects. It licenses construction and operation of nuclear power plants; leases timber harvesting and other uses on Federal lands; and issues permits for dredging, filling in, and for discharging of industrial wastes into navigable waters.

There are several major programs designed to prevent and abate environmental pollution from Federal activities. All Federally owned or operated facilities must meet environmental standards. Those who receive Federal contracts, loans, grants, licenses and permits must comply with environmental standards. In addition, the National Environmental Policy Act of 1969 (NEPA) requires Federal agencies to prepare a detailed statement on the environmental impact of all major Federal actions which significantly affect the environment.

These broad-ranging programs were established to insure that the Federal Government's own activities will not cause environmental degradation. EPA participates heavily in these programs, providing the Federal agencies with technical assistance on a broad range of pollution control and environmental planning subjects.

CONTROL OF POLLUTION FROM FEDERALLY OWNED FACILITIES

On February 4, 1970, President Nixon issued Executive Order 11507 requiring that all buildings, installations, structures and other properties owned by or leased to the Federal Government be designed, operated and maintained to conform with air and water quality standards and related plans of implementation, including emissions standards, adopted pursuant to the Clean Air Act and the Federal Water Pollution Control Act. In those cases where there are no such standards in force for a particular geographic area or in those cases where more stringent requirements are deemed advisable, EPA may establish air and water quality

Municipal golf course built on sanitary landfill: Jackson, Miss.

Documerica Photo

standards for the purpose of the Order, including related schedules for implementation.

The Order directs each Federal agency to maintain surveillance over its facilities to ensure that the standards are met on a continuing basis. In addition, the agencies must consult with EPA concerning the best techniques and methods available for the protection and enhancement of the environment and the adequacy of the performance specifications for proposed pollution control measures.

Since issuance of Executive Order 11507, there have been a number of legislative and executive changes which have a direct bearing on the President's program. Both the Clean Air Act and the Federal Water Pollution Control Act were amended to place greater responsibility on the Federal agencies to ensure that their facilities meet Federal, State and local pollution control and abatement requirements. The Solid Waste Disposal Act was amended to require the Federal agencies to comply with guidelines issued by the Administrator for solid waste disposal at facilities under their jurisdiction. Federal agencies were directed by Section 402 of the Clean Air Act to consult with EPA concerning measures to abate noise pollution problems.

TABLE 42.—Remedial Actions to Control Pollution from Existing Federal Facilities *

	Budget Authority		
	1971	1972	1973
Environmental Protection Agency	2.8	3.9	4.0
Department of Defense	86.8	153.9	232.2
Atomic Energy Commission	0.5	2.4	8.1
Department of Transportation	1.0	7.7	7.2
Department of the Interior	6.2	46.9	11.9
Department of Agriculture	7.2	20.8	29.3
Department of Commerce	0.2	0.5	4.1
General Services Administration	1.5	18.4	0.0
National Aeronautics & Space Admin.	0.7	3.0	0.9
National Science Foundation	—	—	—
Department of Health, Education & Welfare	0.0	0.9	4.8
Department of State	—	—	—
Smithsonian institute	0.0	—	—
Federal Power Commission	—	—	—
Department of Justic (Prisons)	0.1	2.6	0.0
U. S. Postal Service	0.4	1.4	2.0
Department of Housing & Urban Development	—	—	—
Veteran's Administration	4.4	6.3	4.5
Appalachian Regional Commission	—	—	—
Tennessee Valley Authority	0.1	0.1	0.2
Department of Army (Civil Works)	3.8	11.6	5.4
Totals	**115.7**	**280.4**	**314.8**

*(As reported by Agencies and verified by Examiners for the Special Analysis for Selected Environmental Activities, January 18, 1972)

Executive Order 11507 requires that Federal agencies complete or have underway by December 31, 1972, remedial actions necessary to achieve compliance with existing air and water quality standards. Since the Order was issued, the agencies have been designing, and initiating necessary abatement measures. The President's budget requests for 1971, 1972, and 1973 included $116 million, $280 million, and $315 million, respectively, for pollution abatement needs at Federal facilities. Table 42 presents the budget requests by each agency for Fiscal Years 1971, 1972, and 1973. These funds represent a substantial increase over those budgeted in prior years and indicate the high priority given to the program.

This does not mean that the task of controlling pollution from Federal facilities will be finished by December 31, 1972. Some air and water quality standards have come into effect since the Executive Order was issued and standards will continue to evolve during the next few years. Thus, Federal agencies must view pollution control as a continuing responsibility. In addition, in some cases it has been necessary to grant extensions to projects subject to the deadline because pollution control technology is not now available. In such cases, the agencies must schedule appropriate abatement projects as soon as the necessary control technology is developed.

EPA provides technical advice and assistance to the Federal agencies in this effort. Such assistance includes: advising the agencies on the types of corrective options required and the scheduling of such actions; reviewing agencies' fiscal plans for the Office of Management and Budget and recommending budget priorities for projects contained in the plans; and working with the agencies in justifying their budget requests to the Congress.

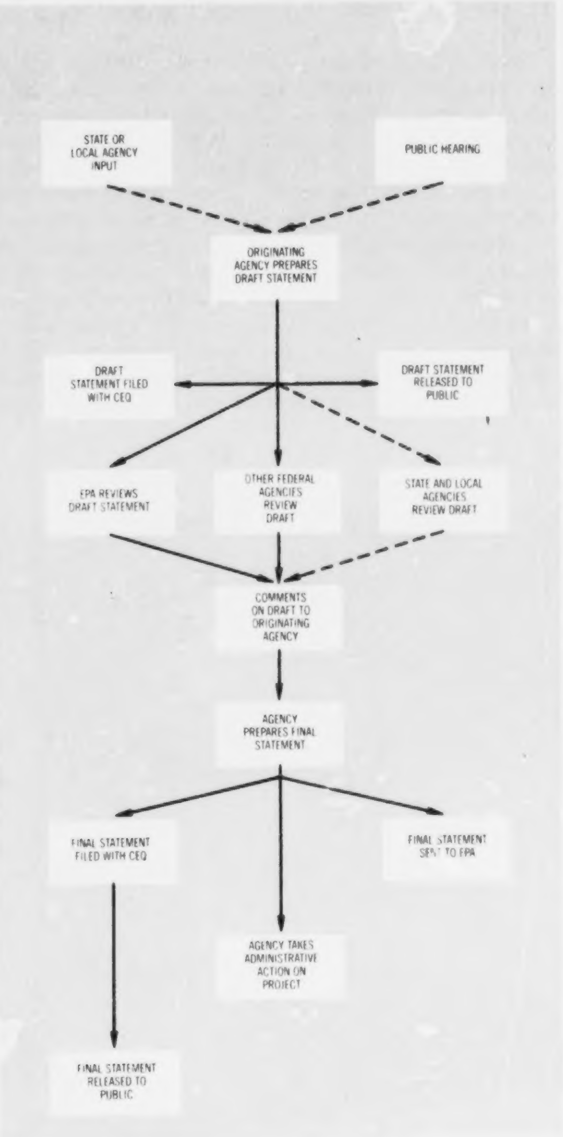
CONTROL OF POLLUTION FROM FEDERALLY SUPPORTED AND AUTHORIZED ACTIVITIES

Several programs have been initiated in response to legislative and executive mandates that actions be taken to control pollution from federally supported and authorized activities. Section 306 of the Clean Air Amendments of 1970 specifies that no Federal agency may enter into any contract for the procurement of goods, materials or services where the contract is to be performed at a facility which has given rise to a conviction for any offense of violating clean air standards. This prohibition continues until the Administrator of EPA certifies that the condition giving rise to a conviction has been corrected.

To implement the provisions of Section 306, the President issued Executive Order 11602 on June 30, 1971, which requires the Federal Government to use its procurement activities, grants and loans to achieve environmental goals. EPA is currently developing regulations to institute a fully operational program to insure that Federal financial assistance goes only to those who comply with clean air requirements.

Already the Federal purchasing power has been used to specify certain qualities in the products which it buys. For example, the General Services Administration has changed its procurement specifications to require that paper purchased by the Federal Government contain a specified minimum percentage of recycled material. Another example is the President's directive that Federal vehicles, whenever possible, will use low-lead or unleaded gasoline.

TABLE 43.–Environmental Impact Statement Process


STATE OR LOCAL AGENCY INPUT
PUBLIC HEARING
ORIGINATING AGENCY PREPARES DRAFT STATEMENT
DRAFT STATEMENT FILED WITH CEQ
DRAFT STATEMENT RELEASED TO PUBLIC
EPA REVIEWS DRAFT STATEMENT
OTHER FEDERAL AGENCIES REVIEW DRAFT
STATE AND LOCAL AGENCIES REVIEW DRAFT
COMMENTS ON DRAFT TO ORIGINATING AGENCY
AGENCY PREPARES FINAL STATEMENT
FINAL STATEMENT FILED WITH CEQ
FINAL STATEMENT SENT TO EPA
AGENCY TAKES ADMINISTRATIVE ACTION ON PROJECT
FINAL STATEMENT RELEASED TO PUBLIC

Section 21b of the Water Quality Improvement Act of 1970, requires that any applicant for a Federal license or permit to conduct an activity which may result in any discharge into navigable waters must provide a certification from the State that the activity will not violate applicable water quality standards. The licensing or permitting agency must notify EPA of such applications and certifications. In those cases where standards have been set by EPA or where the State does not have the authority, such certification must be obtained from EPA.

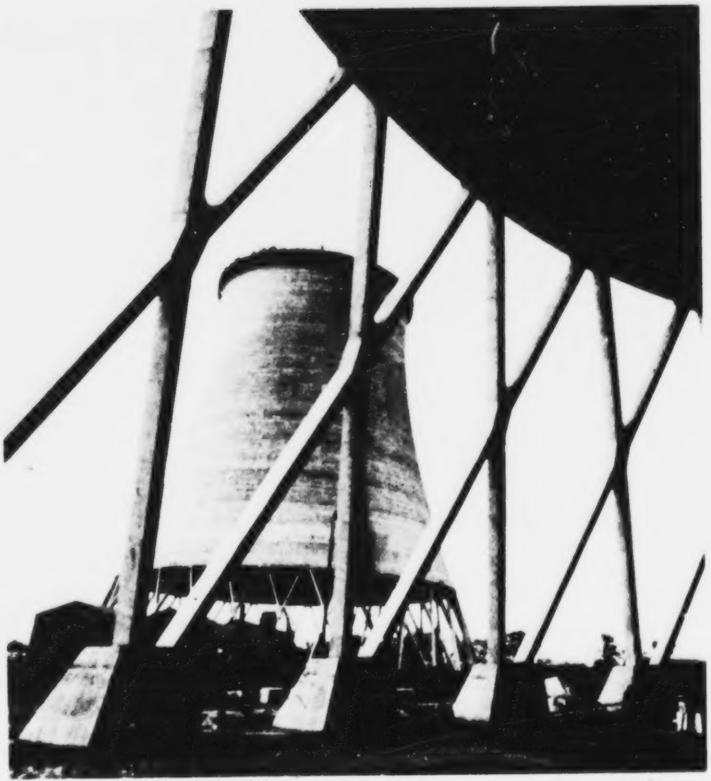
The Resources Recovery Act of 1970, Section 211b, requires that each Federal agency which issues any license or permit for disposal of solid waste shall, prior to the issuance of such license or permit, consult with EPA to insure compliance with guidelines being developed by this Agency.

ENVIRONMENTAL IMPACT STATEMENTS

NEPA requires that all Federal agencies include in every recommendation or report on proposed legislation or other major action significantly affecting the environment a detailed statement assessing the environmental effects of the action, the adverse impacts that cannot be avoided, alternatives to the proposed action, the relationship between short and long-term uses of the environment and any irreversible commitment of resources involved. These statements are often called *102 statements* or environmental impact statements.

These environmental impact statements are reviewed by Government agencies which have jurisdiction by law or which have special expertise on the environmental impacts involved. Because of its authority and expertise in the six primary areas of pollution control—air, water, pesticides, radiation, solid waste, and noise—EPA reviews virtually every impact statement that is filed. EPA's comments are available to the public, as are copies of the impact statements. The facets of the impact statement process which involve widespread coordination and review and public disclosure, are intended to make certain that full consideration is in fact given to the impact of all major Federal actions on the environment.

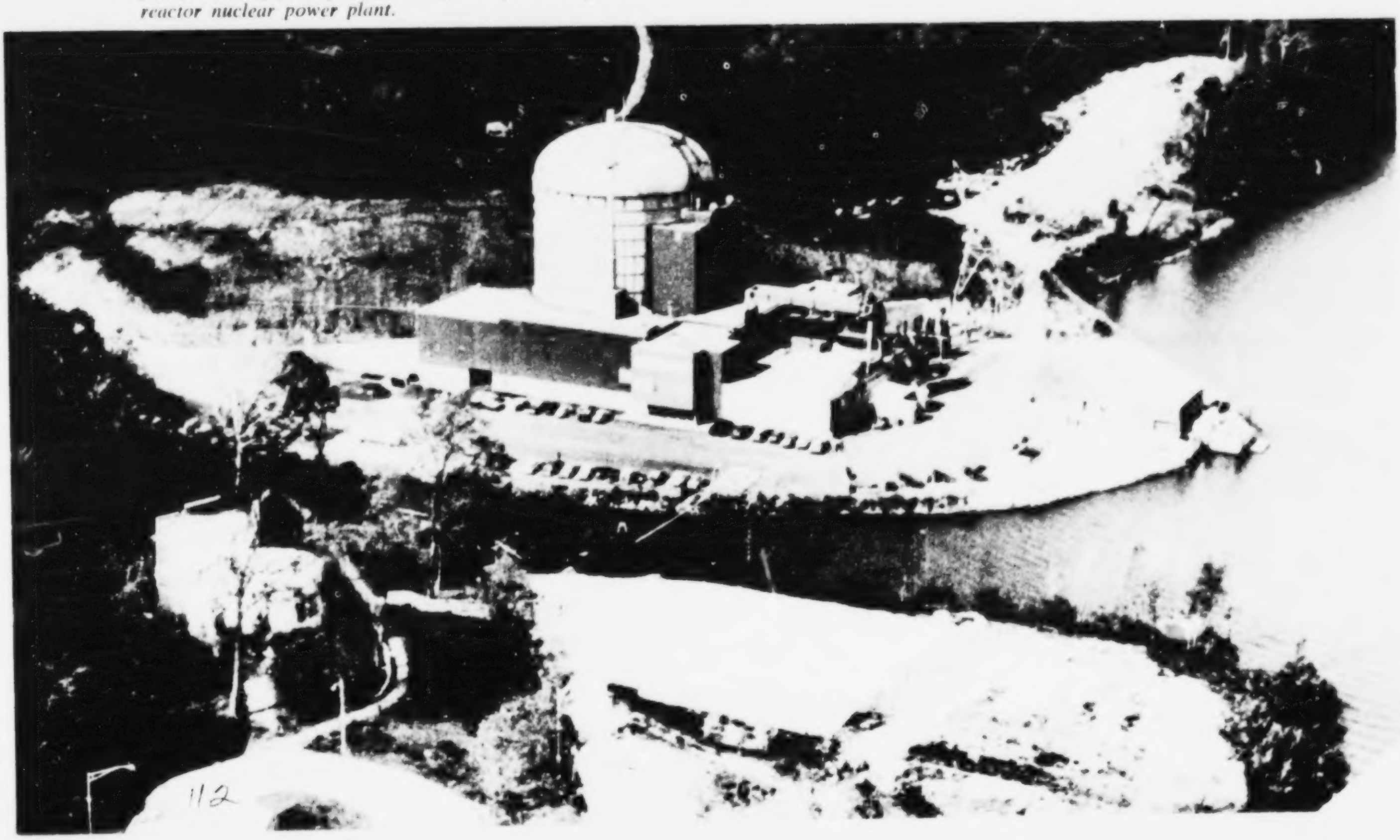
The impact statement requirement has had an important effect on the planning process of the Federal Government. Since the National Environmental Policy Act was signed on January 1, 1970, more than 2,500 statements concerning major Federal actions have been filed. Of those, many of the actions have been significantly modified to avoid environmental hazards pointed out by EPA, other agencies and the public. Some projects have even been halted while additional environmental studies are conducted.


Harrisburg, Pennsylvania: Cooling towers used in waste heat discharge.

For instance, in the case of the Trans-Alaska Pipeline, EPA suggested that the responsible agency, the Department of Interior, investigate the environmental effects of the whole water and land transportation system, not just the pipeline portion of the system; that alternative routes be studied; that consideration be given to using a single corridor for a number of pipelines rather than using separate corridors for each pipeline; that the effectiveness and dependability of the seismic and leak monitoring systems be further investigated; and that the consequences of the pipeline on the permafrost be further studied. The Department of Interior has recently released the results of a major new investigation into the environmental consequences of the project. This inquiry was in direct response to the questions raised by concerned groups, including EPA.

Similarly, the Tocks Island Lake Project which involves construction of a dam near Stroudsburg, Pennsylvania, on the Delaware River also raised some concerns in EPA. In its September 1971 comments on the draft impact statement for this project, EPA requested additional information on the Tocks Island Reservoir Project in regard to water quality. After a review of this information, EPA concluded, in its comments on the final impact statement issued in December of 1971, that water quality in the proposed reservoir would be a serious environmental problem under existing waste treatment conditions in the Upper Delaware Basin. EPA suggested land use controls and well-designed liquid and solid waste disposal plans to prevent pre-

Peach Bottom, Pennsylvania: A high-temperature gas-cooled reactor nuclear power plant.



mature aging of the lake. The Council on Environmental Quality instructed the Corps of Engineers not to initiate construction until additional studies could be completed on means to remedy the environmental problems associated with the dam and until plans to remedy the environmental problems could be developed.

EPA also commented on the Atomic Energy Commission's revised environmental impact statement on the Calvert Cliffs Nuclear Power Plant, to be built on the shores of the Chesapeake Bay. EPA's comments indicated that the plant would probably exceed Maryland State temperature standards more frequently than suggested in the statement. In addition, EPA stated its opinion that the proposed method of reducing power output in order to meet standards would not be practical during periods of peak power demand. Further, it was indicated that current Maryland standards may not be sufficient to adequately protect aquatic life, and that a tentative agreement between EPA and the State of Maryland was reached to revise Maryland's water quality standards. Finally, EPA suggested that additional cooling for the Calvert Cliffs Plant be further evaluated and that the operation of the first reactor be closely monitored to determine the impact on the Chesapeake Bay.

Although EPA's primary mission objectives are to prevent, abate, and control pollution, it too must prepare impact statements on its own actions if they will have a significant impact on the environment. EPA published proposed procedures implementing NEPA in the January 20, 1972, *Federal Register*. These procedures established the administrative framework within EPA for analyzing the environmental effects of wastewater treatment construction grants and other programs and for preparing any necessary impact statements. These procedures have already been implemented, and over 20 impact statements have been prepared and circulated for interagency review.

Clearly, the Federal Government is devoting substantial resources in terms of money, manpower and expertise to the President's commitment to control pollution from Federal activities and to the development of sound environmental planning in Federal decisionmaking. EPA's Federal activities program is a significant contribution to that commitment. EPA will continue to provide its assistance and expertise to the Federal agencies in their efforts to operate in a manner consistent with a clean, safe environment.

INTERNATIONAL ACTIVITIES

Environmental problems overlap national boundaries and transcend ideological barriers. Because the oceans and atmosphere are global systems, pollution in any of their part effects many nations. The smoke and toxic effluents of one country pollute others. Penguins of Antarctica and fish in the deep ocean contain DDT although they are thousands of miles from the pollution source.

Because pollution is global, unilateral action alone is not sufficient to combat it. Many of the initiatives needed to attack world environmental problems are new, require coordinated action and demand novel methods of international organization and cooperative action. Recognizing this fact, President Nixon said in transmitting his 1970 Report to the Congress on Foreign Policy for the 1970's: "We know we must act as one world in restoring the world's environment, before pollution of the seas and skies overwhelms every nation." The United States and other nations are seeking to combat pollution through international cooperative action, and EPA is acting to support this effort.

EPA is responsible for developing and implementing international cooperative agreements, coordinating its activities with other nations and maintaining contact with other United States agencies involved in foreign affairs. EPA deals with multilateral organizations, bilateral programs, science and technology and international exchanges. Specialists participating in EPA's international activities come from EPA Headquarters, the Regional Offices, Research Centers and laboratories.

EPA pursues its international activities in an effort to encourage world-wide action to prevent further deterioration of the environment, to reduce, and if possible to eliminate existing pollution and to improve the quality of life for present and future generations. The information and experience gained through cooperative efforts enhance the Agency's knowledge and expertise which in turn contributes to the domestic program. The assessment and transfer of pollution abatement technology from other countries also assists EPA.

Most of the Agency's international activities today are directed toward the exchange of information, cooperative research, data collection and the production or promotion of environmental investigations. Some cooperative activities consist of action programs for preventing or reducing pollution. Most require the exchange of informational material or personnel. Many stem from United States membership in a wide variety of international organizations; others arise from new and pressing needs to meet immediate environmental problems.

U.N. CONFERENCE

During 1971 EPA devoted particular emphasis to assisting in the preparations for the United Nations Conference on the Human Environment, which was held in June 1972 in Stockholm. The Conference was the first major world-wide environmental conference and may well be a landmark in the development of international environmental cooperation. The Conference was intended to be a global convocation to stimulate action on environmental problems affecting the interests of all nations. Special attention in the session was given to ways to reconcile national activities in the fields of environment and economic development. Five Conference topics of special interest were marine pollution, monitoring and surveillance, conservations, soils and a declaration on the environment.

EPA specialists have taken an active part in the work of the Preparatory Committee. They participated in the work of the Working Groups on Marine Pollution, and Monitoring and Surveillance of Global Pollution, and in other aspects of Conference preparation. They led U.S. preparations for the agenda items on the Identification and Control of Pollutants and Nuisances of Broad International Significance.

MULTILATERAL ORGANIZATIONS

EPA participates in the work of a number of multilateral intergovernmental organizations concerned with environmental matters. During 1971, EPA specialists took an active part in the continuing environmental activities of the United Nations specialized international organizations, such as the World Health Organization (WHO), the Food and Agriculture Organization (FAO), the World Meteorological Organization (WMO), the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the International Atomic Energy Agency (IAEA). They were active in the WHO/FAO Codex Alimentarius Commission on pesticide residues in food and in the UN's Joint Group of Experts on the Scientific Aspects of Marine Pollution (GESAMP).

EPA experts play an active role in the work of the Environment Committee and Sector Groups of the Organization of Economic Cooperation and Development (OECD), which is comprised of the major industrial nations of the free world. OECD is concenttrating on economic and trade effects of environmental protection measures, particularly in the fields of water management, air pollution, noise abatement and the undesirable effects of pesticide residues.

In the North Atlantic Treaty Organization's Committee on Challenges of Modern Society (NATO/

CCMS), which, at the suggestion of President Nixon, is working on special problems of industrialized societies, EPA specialists are leading cooperative projects on air pollution and development of low pollution motor vehicles. They are also participating in projects in advanced wastewater treatment and the investigation of river basin management on the St. John River between Maine and New Brunswick.

EPA is assisting the efforts of the Intergovernmental Maritime Consultative Organization (IMCO), particularly in preventing marine pollution from oil spills. It is also assisting the Economic Commission for Europe (ECE), by taking part in the 1971 Prague Symposium on environmental problems. The ECE is serving as a forum for information exchange between Eastern and Western nations on pollution control.

The international community made progress last year in developing cooperative approaches to gathering and compiling global economic and scientific information, which will assist in understanding the level and effects of environmental pollution. The international monitoring of global pollutants is of growing interest. At the request of other nations EPA is providing detailed information on U.S. standards and abatement methods. The Agency is serving as an International Reference Center for air pollution at the request of the World Health Organization.

BILATERAL COOPERATION

One of the most rapidly developing areas of international environmental cooperation is in the bilateral field. EPA is actively participating in this growing field and is working to expand its bilateral activities.

Major bilateral programs are developing with the neighboring nations of Canada and Mexico. During 1971 EPA experts joined in the preparations for the June U.S.-Canadian Ministerial Meeting on Great Lakes Pollution. This meeting concluded a Great Lakes Water Quality Agreement between the two nations to combat pollution on the Great Lakes.

Meanwhile close U.S. and Canadian pollution control cooperation on the Red River, Rainy River and Lake of the Woods, St. Croix River and in the Great Lakes and their connecting channels continued within the framework of the International Joint Commission, a unique and competent international body created by the Boundary Waters Treaty of 1909. The Commission is also investigating air pollution in the Detroit-Windsor area. EPA officials are active on all the Commission's pollution advisory boards. They also took part in discussions with Canadian officials concerning possible oil spill pollution from tankers along the southern west coast boundary between the two countries.

Close bilateral cooperation with Mexico is also under development. In 1971, EPA met with its Mexican counterparts to assist in establishing an air monitoring system for Mexico City, exchange of information and experience for establishing national air and water standards in Mexico, and agreement on a loan of air monitoring equipment for exchanging comparable data on the effects of air pollution at high altitudes. They also took part in Mexico's first pollution abatement conference in Monterrey.

Documerica Photo

Polluted section near Gulf Coast, 100 miles south of Houston, Texas.

Bilateral exchanges with Japan, France and other countries also moved ahead in 1971. The U.S. and Japan have exchanged environmental information for many years under the U.S.-Japan Cooperative Program on Natural Resources. Joint air and water pollution programs began in 1970 and in June 1971 the two Governments agreed to exchange information on curbing air pollution from automobiles and on applying advanced technology to sewage treatment. EPA representatives also took part in the first U.S. trade exhibit on pollution abatement technology in Japan which resulted in large sales of U.S. equipment. They also took part in the exchange of experts and documentation in air and water legislation and standards. With France, EPA specialists are cooperating in planning of the pollution-free model city, Le Vaudreuil. Cooperative activities are also underway or under consideration with Germany, Spain, Switzerland, Sweden and the United Kingdom.

During 1971, EPA air pollution officials visited the USSR at Soviet invitation as part of a bilateral scientific exchange agreement. Polish authorities visited the U.S. to discuss possible air and water pollution and solid waste management cooperation, and EPA experts made a return visit to Poland. An EPA team visited Romania to discuss advanced wastewater treatment. In trilateral discussions EPA, Canadian and United Kingdom officials met in a continuing series of talks on pesticides, and EPA, Swedish and Canadian officials continued consultations on phosphates and NTA.

SPECIAL FOREIGN CURRENCY PROGRAMS

Activities under EPA's Special Foreign Currency Program were developed and broadened during 1971. Fifteen joint projects in air and water pollution and solid waste management were conducted with India, Israel, Poland and Yugoslavia valued at $3.5 million in Fiscal Year 1971.

These cooperative activities relate directly to EPA and foreign country needs. They merge the scientific and resource capabilities of the countries in a concerted attack on specific environment problems while contributing valuable knowledge and experience to supplement the Agency's domestic programs. Administered by the Office of International Affairs, the program is funded from excess foreign currencies accruing to the United States under various U.S. programs in countries overseas. During Fiscal Year 1972 approximately 7.5 million dollars were available to fund new cooperative activities under the program.

In addition, EPA activities supported through dollar grants and contracts in countries, other than those under the Special Foreign Currency Program, draw upon the skills and knowledge of foreign experts to assist domestic programs. Awards made include those to institutions in England, France, Japan and Sweden.

EXCHANGE OF INFORMATION

During the past year, EPA engaged in a broadening program of exchange activities with other nations. EPA briefed over 1,200 visitors, including the science attaches of Embassies in Washington and Foreign Press Corps, other government officials, scientists, engineers, journalists and industrialists. EPA specialists met with a wide range of foreign experts, among them the foreign news editors of 15 leading Southeast Asian newspapers; representatives of 20 Japanese firms; labor representatives from Australia, Germany, France and Israel; Members of Parliament from Brazil, Italy, Germany, the Netherlands and the United Kingdom; and local government officials from New Zealand and Australia.

The Agency continued an extensive information program, distributing technical and descriptive material to pollution agencies and experts around the globe and mailing pertinent information to U.S. Science Attaches throughout the world. Plans have been initiated to develop an Agency-wide International Visitors Service and regional tours of EPA facilities throughout the country for foreign visitors. Steps are now being taken to assist the Agency for International Development to train environmentalists from developing nations.

Opening day of the Trout season of Kings River, Fresno, California.

Documerica Photo

VIEWING WORLD DEVELOPMENTS

EPA's expanding international activities in 1971 reflected the growing awakening to the international nature of common environmental concerns. Like the United States, many nations realize the need to upgrade their environmental programs and organizations and to broaden their policy and legislative authority to deal with environmental degradation. Australia, Canada, France, Germany, Great Britain, India, Japan, New Zealand, Norway, Singapore, Switzerland and the United States have reorganized or plan to improve their environmental protection programs. Multilateral organizations stepped up their environmental activities, and the international community as a whole took a giant step forward in employing international cooperation as a tool in preserving environmental quality. The year also saw a major stride toward a cooperative approach to combating international pollution and environmental problems. A number of developing nations question the need for strong pollution abatement efforts in light of their pressing economic development needs. Many nations, however, recognize that the broadening and strengthening of cooperative programs is essential if countries are to deal effectively with the problem of global pollution.

TABLE 44.—Special Foreign Currency Program

Program & Country	Cumulative obligation through FY 1971	Number of projects	Estimated obligation for FY 1972	Estimated No. of projects	Estimated obligation for FY 1973	Estimated No. of projects
Air	3,427,153	10	3,078,000	11	3,100,000	9
India	—	—	1,065,000	6	790,000	4
Poland	315,727	2	920,000	3	1,450,000	4
Yugoslavia	3,111,426	8	750,000	1	800,000	1
Water	254,000	2	1,720,000	6	2,150,000	7
India	—	—	520,000	2	350,000	1
Poland	—	—	—	—	650,000	2
Yugoslavia	54,000	1	950,000	3	350,000	1
UAR	—	—	—	—	350,000	1
Pakistan	—	—	—	—	450,000	2
Tunisia	—	—	250,000	1	—	—
Israel	200,000	1	—	—	—	—
Solid Waste	33,566	1	650,000	2	2,150,000	8
India	33,566	1	—	—	200,000	1
Poland	—	—	325,000	1	1,125,000	4
Yugoslavia	—	—	325,000	1	525,000	2
Pakistan	—	—	—	—	300,000	1
Pesticides & Toxic Mat	—	—	1,900,000	4	3,550,000	8
India	—	—	1,400,000	3	3,175,000	7
Poland	—	—	500,000	1	375,000	1
Radiation	161,000	2	296,000	4	775,000	5
India	81,274	1	46,000	2	—	—
Poland	—	—	250,000	2	275,000	1
Yugoslavia	—	—	—	—	50,000	1
UAR	—	—	—	—	450,000	3
Israel	80,240	1	—	—	—	—
Noise	—	—	100,000	1	1,200,000	5
Poland	—	—	—	—	750,000	3
Yugoslavia	—	—	100,000	1	450,000	2
OIA Program Support	—	—	50,000		50,000	2
Total	3,876,233	15	7,794,000	28	12,975,000	42

[1] Includes $343,000 as transfer to National Science Foundation for Translations.
[2] Includes $60,000 as transfer to National Science Foundation for Translations.